Amateur Communications

February 1993 • $2.50

The Ham Operator's Magazine

PRODUCT REVIEW: Near Field Monitoring Test Sets

By Gordon West, WB6NOA

A Ground System For The Ham Shack

By Richard Morrow, K5CNF

Entry Level Ham License Changes

By Frederick Maia, W5YI

PROPAGATION CONCEPTS: "Big Brother" Is Watching You

By James G. Lee, W6VAT

Puerto Rico's First Radio Amateurs

By Joaquín Agusty, PR4JE

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Please write to **Lodging, Dayton Hamvention, Chamber Plaza, 5th & Main Streets, Dayton, OH 45402-2400** or refer to our 1992 Hamvention program for a listing of hotel/motels in the Dayton area.

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Nominations are requested for Amateur of the Year, Special Achievement and Technical Excellence awards. Refer to the Hamvention Program for nomination form or contact Hamvention Awards Chairman, Box 964, Dayton, OH 45401-0964.

1993 Deadlines

Award Nominations: March 1
Advance Registration and Banquet:
USA - April 2 Canada - March 26
Flea Market Space: February 1

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Flea Market Tickets (valid all 3 days) will be sold IN ADVANCE ONLY. No spaces sold at gate. A maximum of 3 spaces per person (non-transferable). Electricity is now available in a portion of the last Flea Market row for $40 additional per space. Rental tables and chairs are not available in the Flea Market. Vendors ***MUST*** order an admission ticket when ordering Flea Market spaces. Please send a separate check for Flea Market space(s) and admission ticket(s). Spaces will be allocated by the Hamvention committee from all orders received by February 1. Please use 1st class mail *only*.

Notification of Flea Market space assignment will be mailed by March 15, 1993. Checks will not be deposited until after the selection process is complete.

HAMVENTION Is sponsored by the Dayton Amateur Radio Association Inc.

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VOL. 4 NO. 2 FEBRUARY 1993

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Amateur Communications Magazine (ISSN 1066-8640), (USPS 005463) is published monthly by The Communications Publishing Group, 8250 NW 27 ST, Suite 301, Miami, FL 33122. Telephone (305) 594-7734. FAX (305) 594-7677. Second-Class postage paid at Miami, FL.

POSTMASTER: Send address changes to Amateur Communications Magazine, 8250 NW 27 ST, Suite 301, Miami, FL 33122. Telephone (305) 594-7734. FAX (305) 594-7677.

Subscription Prices:
Domestic: One year $19.95, two years $34.95, three years $49.95. Canada and Mexico: one year subscription $45.00, surface $25.00. Foreign Air Mail: one year $70.00.

Please allow four to six weeks to receive first issue and for change of address.

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Amateur Communications

The Ham Operator's Magazine

COVER: Joaquín Agusty, PR4JE's work desk on exhibit at the Radio Museum of Puerto Rico. See feature on page 7. Photo courtesy of The Radio Museum of Puerto Rico and KP4AA.

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The opinions expressed by the independent contributors of *Amateur Communications Magazine* do not necessarily reflect those of the staff, management or owners.

We welcome contrasting points of view.

Contributions are welcomed and should be submitted in a 3½ or 5¼ disk in ASCII file along with a double-spaced hard copy to: *Amateur Communications Magazine*, 8250 NW 27 St., Suite 301, Miami, FL 33122.

AMATEUR COMMUNICATIONS FORUM

If The Glove Fits...

Dear Sirs:

Congratulations on *Amateur Communications*. The name fits like a glove.

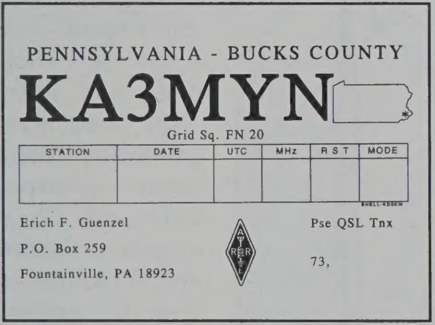
73,
Larry Amann, K5TQN
Ormond Beach, FL

* * *

We Love You Too, Erich

Dear Sirs:

Income problems forced me to cancel all my radio magazines, except for yours. Love the antenna projects and FCC info.



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73,

Erich F. Guenzel
Fountainville, PA

* * *

Reciprocally Yours

Dear Editor:

During a recent visit to the U.S. I purchased the September 1992 copy of your magazine from Universal Radio in Columbus, Ohio. Congratulations on an excellent magazine. The article by Leo Bloom was great publicity for New Zealand and prompted me to send you the enclosed information on reciprocal amateur radio licensing between our countries.

Our policy now is very much an "open door" policy, no hassle, no application, no fee. It is valid for 28 days of operation on VHF and UHF bands only. H.F. operation does require a permit, but again, on a hassle free, no prior application basis. The license is issued over the counter by the New Zealand Radio Frequency Service. This permit is available to those countries with reciprocal agreements, as has the U.S.

R.A. Garlick, ZL3AAA
Greymouth, New Zealand

* * *

Never Fear... Amateur Communications Is Here

Gentlemen:

Something has gone wrong. I did not receive the last two issues of your magazine. Did the mail lose them? I have all your other magazines. The important thing is that I save all of them from Volume I, #1 up. Do *whatever is necessary* to replace those two. Your magazine is the best I've seen in a long time.

Leonard Schaafsma, W8SPX
Grand Rapids, MI

* * *

That's Grrrreat!

To the Editors:

Great magazine! Great rates! Great new name! Always on time. Here's my renewal!

Al Onyskin, KB2JGZ
Huntington, NY

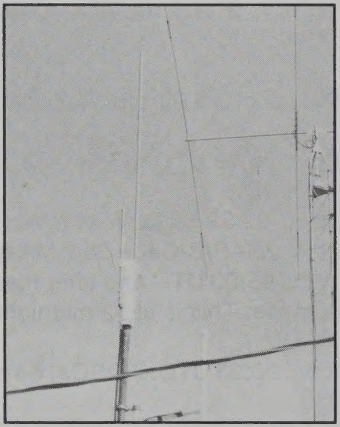
* * *

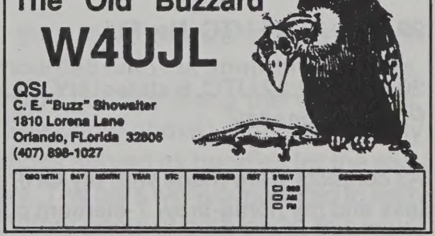
Lane's J-Pole A Success

Dear Rita:

This is a photo of the "J Pole" copper antenna I built over plans (by Pat Lane, W4OQG) in the August 1992 issue of your magazine. It works like a champion! I made a few modifications to suit the materials I had available. Total cost $7.40.

See you in Miami at the Hamboree. 73s.





The "Old" Buzzard

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C.E. "Buzz" Showalter, W4UJL
Orlando, FL

AMATEUR COMMUNICATIONS FORUM

December 7, 1992

Hi again Bob,

After our very nice phone discussion recently concerning your reporting of little or no 6-meter VHF activity from your sources during the past several months, I have decided to update you and readers. The "Magic Band" of 6 meters has been open from this QTH many, many times during this period. As you recall, I had 8 "VK" contacts during the excellent F2 opening back on April 17. Since then, I made over 100 QSOs with over 25 states and 11 countries during the big VHF contest of 13 and 14 June 1992, also worked TG9AJR and YS1AG on 16 June. I won the SMIRK 6-meter VHF contest for Florida, (20-21 June) plus many hundreds of contacts including DX during July and August, 1992. So, let's start with mid October '92...

12 Oct.: 21:37 UTC, 7 LUs! 3 Grids! LU2EIO, LU2DGO, LU3EW, LU8AHW, LU4DMX, LU5EMM, LU6DTN, most with 5-9+ sigs.!

18 Oct.: 18:14 UTC, 8 states including IN, WI, IL, MI, MD, NC, VA, FL!

24 Oct.: 01:22 UTC, VE3FGU, Canada plus WB8, OH and N8, MI.

25 Oct.: 00:16 UTC, N5WQX, TX.

03 Nov.: 00:19 UTC, N5TIP, TX and K5ZXE, OK.

18 Nov.: 02:33 UTC, WA1T, NH and WA1BAR, CT 5-9s. (Note: W2CAP/B-Cape Cod, MA and KS2T/B beacons were 5-9-9 'till 05:00 UTC and after many CQs no other contacts were made. This is at 12 midnight EST!)

23 Nov.: 00:23 UTC, 7 QSOs, 6 states, AK, AR, MS, FL, TX, LA.

28 Nov.: 02:30 UTC, 3 states, AL, AR, MI!

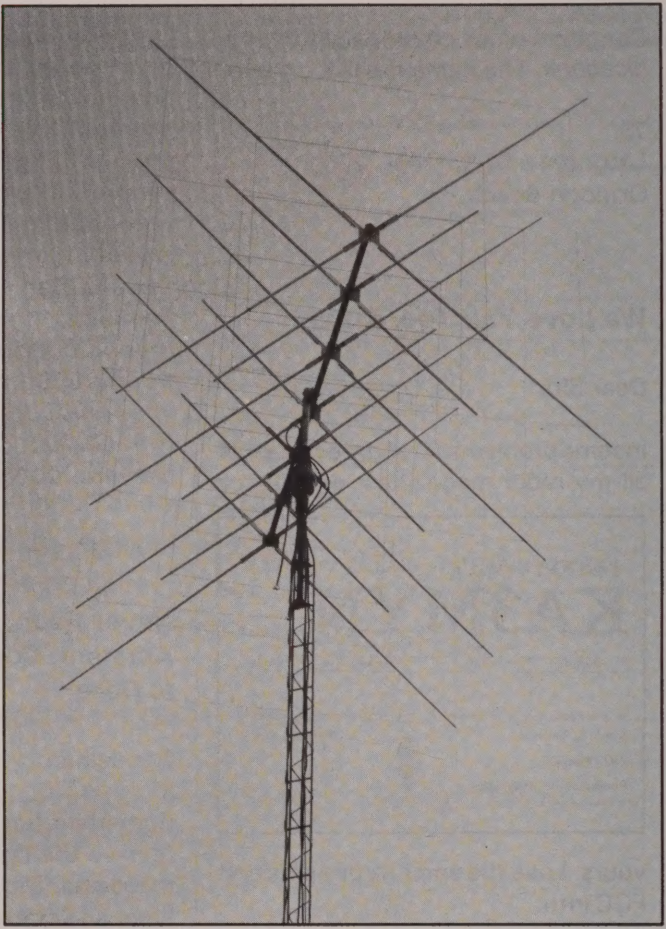
29 Nov.: 15:45 UTC, No. FL!

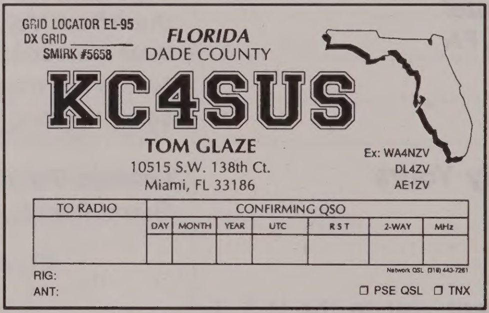
30 Nov.: 02:22 UTC, 8 states! NY, FL, MI, OH, CT, NJ, NH, PA plus Canada!

All contacts were made with my QRP station of 10 watts or less and my home-brew 7-element cubical quad at 32 feet.

73s,
Tom Glaze, KC4SUS

***Editor's Note:** KC4SUS writes in response to 6-meter VHF activity reports on our Ham Briefs section. Turn to page 29 for writer's comments.*





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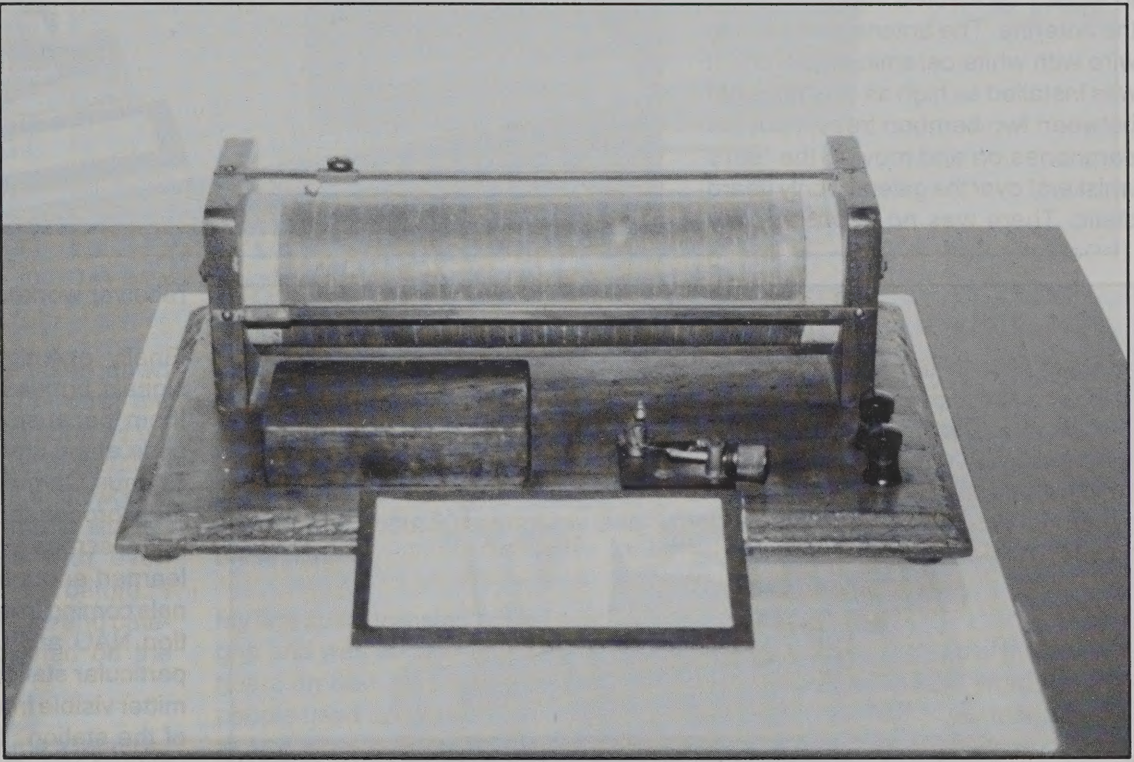
Good thoughts and a get-well wish go out to our publisher KC4NOF, who is currently recuperating from an accident he suffered during the Holidays.

Amateur Communications staff

Puerto Rico's First Radio Amateurs

Original article by Joaquín Agusty, PR4JE

I'm writing these lines at the request of my friend Juan S. Sepúlveda, KP4QM, vice president of the Puerto Rico Radio Club. Since I am not a writer and have never been interested in publishing matters, I hope you'll be kind enough to forgive my errors in composition. I'm writing for the radio amateurs of today, club members and non members, who don't know much about the trials and tribulations of radio amateurs of yesteryear. Many of you may be interested in finding out how the pioneers of radio "managed" fifty years ago.

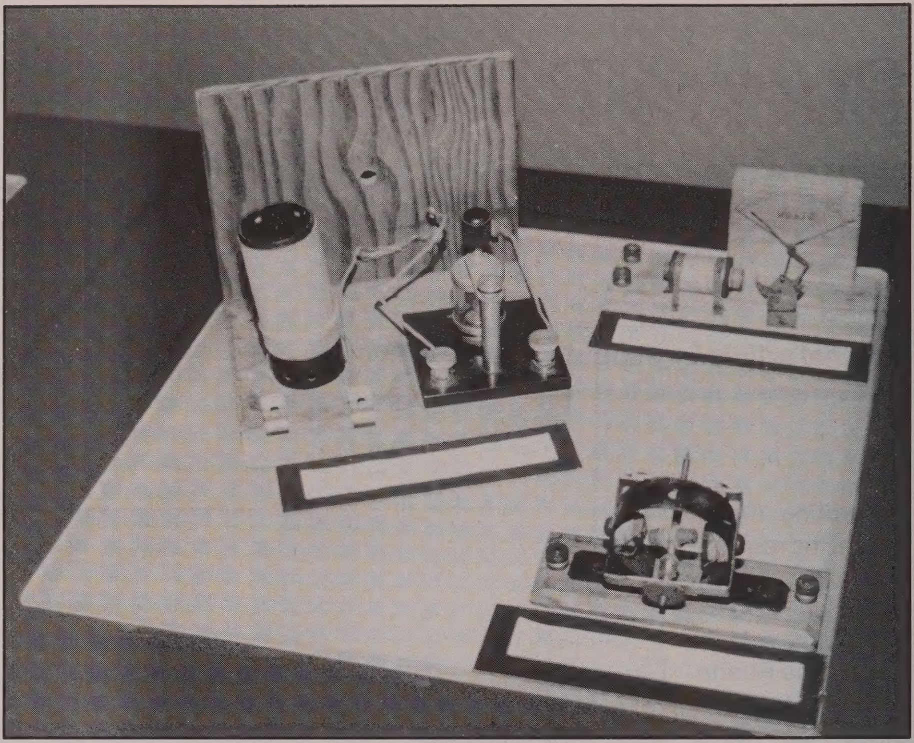


Galena radio built by Joaquín Agusty, PR4JE, in 1916. This was his first radio. It used batteries and headphones. This is one of the main pieces featured at the Radio Museum in Puerto Rico.

Before I proceed any further, let it be known that tools are my hobby, yet building my first galena radio was quite a project! I bought the galena, two binding posts and a pair of inexpensive earphones from *Electro Importing Co.*, in New York. For the rest of the parts, I had to turn to local vendors since my budget only went so far. I waxed a 2" diam. by 9" length cardboard tube, and wound 8" of No.20 wire around it. I affixed two small boards at the ends of the tube in order to mount them later on the wood base. At the center of the small wood boards I fastened two bronze terminals taken from a large dead battery. I cut two 1/8" bronze bars and affixed them to the sides of the wood plates.

I then built bronze sliders, which mounted onto the small bronze bars, made contact along the wire turns. *(See photo above)*. Buttons from my shoes served as handles for the sliders. The bars were connected to both battery posts at both ends, this way I would be able to select the number of turns until the signals were tuned.

The tin I needed came from a few



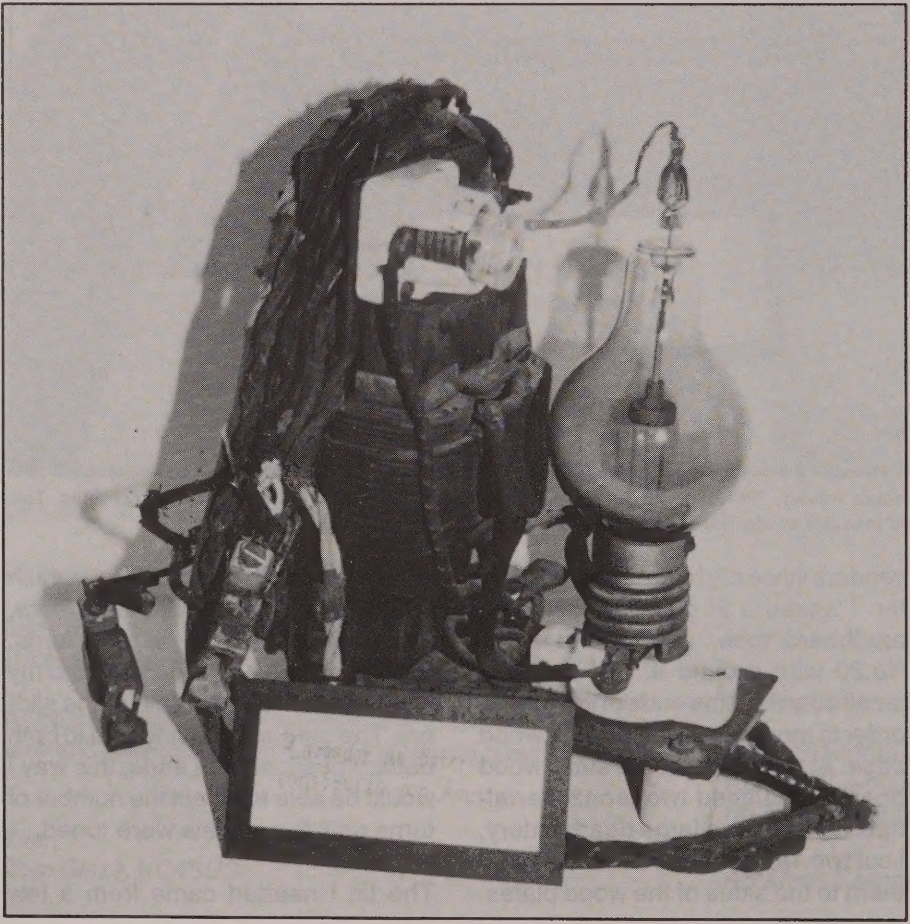
Clockwise from left: galena receiver, 1920; home-brewed voltmeter, 1917; motor made by Agusty, 1918.

carefully removed *Menier* chocolate wrappers. Neatly pressed, they were placed between wax-coated sheets of silk paper (no paraffin available at the time). If asked, I couldn't tell the capacity of this fixed condenser, (at the time, I didn't know what a microfarad was).

When everything was wired and ready to work, I connected the ground and the antenna. The antenna was a long wire with white ceramic insulators. It was installed as high as was possible between two bamboo trees. I put the earphones on and moving the "cat's whiskers" over the galena, I only heard static. There was no doubt that my receiver worked.

Finally, one night I heard continuous signals, but was unable to understand them because I didn't know Morse code at the time. I interested my son Enrique Camuñas in my project and then proceeded to built a key from metal scraps and a piece of can. We learned enough CW to interpret signals coming from the government station NAU at Puerta de Tierra. This particular station used a spark transmitter visible from the road at the front of the station. It communicated with ships at sea. Only when these ships were close to shore, were we able to capture their signals. We had to build a new and better receiver. My mistake was thinking that we needed more coil turns in order to achieve greater reach!

I built a new receiver--which looked more like a coffin than anything else--using a 10" diam. by 24" length tube.



Battery charger built by Agusty, also on exhibit at the Museum.

This intercommunicator was built in 1920 by PR4JE.

I procured No.32 wire from a friend and carefully wound thousands of turns marking each tenth turn, making contact with a clip. As a detector I tried a drop of sulfuric acid, Molibdenum crystals, iron pyrites, etc. and ended up going back to the original galena which proved easier to handle and better all around.

This receiver did not work better than the first and it only used ten wire turns to tune into all that could be heard. It ended up in the hands of an electrician by the name of Salvador Gil, now gone. His brother Pedro Gil, a highly-educated man and a radio enthusiast, still lives in Hato Rey.

My antenna had to be taken down during World War I, as ordered by the Federal government. As soon as armistice was confirmed on November 11, 1918, I reinstalled it and eagerly pursued electricity and radio studies and experimentations with even greater enthusiasm than before. I obtained any and all books and catalogues that were published on the subject at the time.

By that time, I had become a member of the ARRL and began to construct my first 500-watt spark transmitter, of which only pictures remain. I must add that we would visit all the ships from the Porto Rico line; the San Juan, the Ponce, the Coamo, etc., and I became friendly with the operators who later proved to be quite helpful and who visited me at my shack. One of them gave me an old Coamo antenna switch and two high-voltage condensers known as "Layden Jars". I still have both of these. The condensers were glass jars coated with copper inside and out and had 4-microfarad power. These improved my spark transmitter. One of these operators was Dick Schell always a good friend, even though I haven't seen him for about 50 years. May God bless him.

My first spark transmitter had a rotary gap and was so loud that it could be heard on San Jose Street and many people used to come up to the shack to see what was going on. I'm sure many thought I was insane.

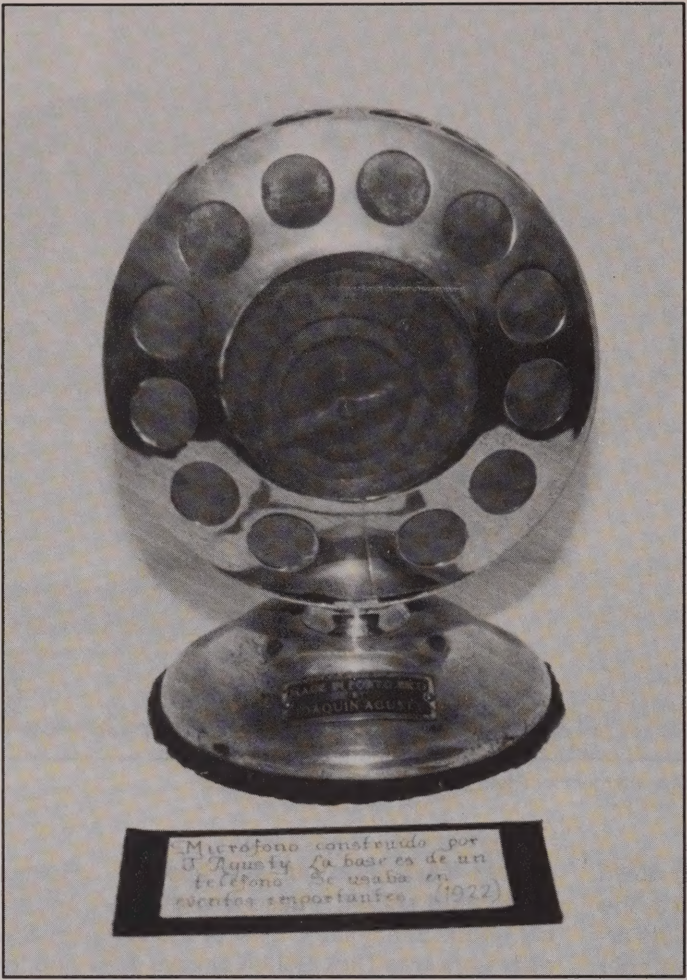
The truth is that my signals were not being heard anywhere. Energy losses were great, to the extent that my wife's mother complained that sparks would fly off from her iron bed.

The worst came later, when a naval officer came to visit to inform me that I was causing interference with their station. He invited me to the station where I met Commander Herzog--for whom I later built a receiver. The Commander lent me a 400-question and answer exam book so that I could obtain an operator's licenses for myself and for the station. My son Camuñas went first. He took and passed the exam and came to be Puerto Rico's first amateur radio operator with the call PR4LG. Then I went.

The exam was made up of the technical section and the 18 words in the telegraphy section. The test papers returned from Washington and I had passed. My call letters were PR4JE and I had been issued a license. I remember that one of the questions required a correct drawing of a diagram of the transmitter and explanation of the function of each of its parts.

I was supposed to be transmitting on two-hundred meters (back then frequencies were not in cycles and, of course, not in megacycles). But, I didn't know where I was. I ordered a wave gauge which included a shielded variable condenser, a few interchangeable coils and a small flashlight bulb. It came with a calibrated chart and I tried placing the coil at the antenna output. I was on 400 meters, the ships' frequency! No wonder they complained. I adjusted the oscillator down to 200 meters. Interference with NAU was now reduced by 90%, but theirs continued to bother me and there was no hope in sight! Still, no one heard me.

One day, someone visited me. He was a new and amiable radio enthusiast who had just obtained a De Forest galena receiver. This receiver was the kind that could be placed on a panel on which other items could be added later on. He told me that he had built a four-tube transmitter on a board and that he was waiting for his license, as he had just taken the exam. He was surprised to see all I had and had built. Since then, we became inseparable friends. His name is Jesus T. Piñero, PR4KT. (Note that at the time the letter W was not in use).



Agusty built this microphone in 1922. The base was taken from a telephone. It was used for important events at WKAQ.

We got to work in trying to convince our friends Pedro Rodríguez, J.M. Maduro, Leopoldo V. Bello, Luis Rexach and Arthur Mescus to join our efforts and founded the Porto Rico Radio Club, Inc. in 1921. Later we took-in Arturo E. Saldaña, Mario Castro Fernández, Juan Luis Caselas, Perucho León, Carrero de Mayaguez, Facundo Bueso and many more I fail to remember. Most of them took their exams and some set up their own stations.

After unsuccessful attempts, one night Piñero called me on the telephone. I had a feeling. Excitedly he told me that he was picking up my signals, and for me to try to listen to his. And that's how it happened. We established communication, he with voice and I with dots and dashes. This was the first radio communication between two amateurs in Puerto Rico. The news got around and soon I was being visited by doctors, lawyers, Supreme Court judges, businessmen and even Puerto Rico's Treasurer, at the time.

I would give Piñero the names of the persons that were with me and he would answer me by radio, greeting them and encouraging them to become members of the Club. We heard everything on a *Magnavox* speaker. This would go on every night.

The Club's membership increased rapidly. Our monthly dues were .75¢, and members were given personal button-pins with a special space reserved for the call numbers of those who had tested and passed. Club membership rose to 408, 95% were active members.

At one point, the need arose for a magazine to be published. The first two issues were mimeographed. The ones that followed were printed by *Real Hnos*. with a two-color cover. ARRL supplied us with clichés. We also obtained them from *Photoengraving* whose owners were also members of the Club.

The magazine was written in English and Spanish by Piñero and Rexach. 1,500 copies would be printed and issued to club members, sent to operators in Latin America and Europe, and the rest were distributed among anyone else who was interested in radio. We rented an office in San José. There were chairs, tables and a *Western Electric* transmitter we acquired from the Surplus store, in order to transmit technical information, music, etc.

It was 1921. We needed to build better receivers and transmitters. I ordered a new tube recently manufactured by *Cunningham* in California. The tubes were called "audions". I obtained jacks, plugs, and the telephone and then proceeded to build spider web coils and two audio transformers. I removed the plates from the center of door bell transformers, and then coiled these with insulated wire from a *Ford* ignition system: 200

(Continued on page 60)

Newington Hams Adopt Explorer Troop

Pictured here in a recent ceremony are Chuck Motes, of the Explorers; John Hennessey, KJ4KB; Rosalie White, WA1STO; Dave Summer, K1ZZ, (Executive Vice President of ARRL); Brad Thomas, KC1EX; Doug Stone, (accepting certificate); Les Andrew, Andrew Motes and David Moskal.

Newington, CT—Area "Explorers" got a high-tech boost last December when the American Radio Relay League (ARRL) announced its sponsorship of Explorer Post 73. ARRL is a national organization of Amateur Radio operators. Explorers are the highest rank in the Boy Scouts of America. The co-educational group includes members in the 14 to 20 year-old age group.

Rosalie White, Educational Activities Manager for ARRL says that the League looks forward to being active in the scouting movement again. She added that in the past, scouting has been one of the traditional routes into Amateur Radio and other technical areas, and many who work at the League look forward to participating in this project.

White says the organization plans to help the Explorers with a variety of electronics projects, and possibly develop classes leading toward Amateur Radio licenses for them.

The post roster includes Jesse Marsan, James Motes and Andrew Motes of Plainville, Marc Petruzzi of South Windsor and Monique LaPointe of Bristol. Adult advisors are Charles Motes, Jr. of Plainville, Leslie Andrew of West Hartford, Susan Fredrickson of Pleasant Valley and Jack McLaughlin of Southington.

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"Big Brother" Is Watching You

By James G. Lee, W6VAT

It may seem strange to begin the story of radio propagation with a discussion of an astronomical body such as our Sun, but if it wasn't for our "big brother" out in space, not only would there be no amateur radio—none of us would be here. It is the Sun's radiated energy in the form of heat, light, ultra-violet rays, and particulate matter, which works in combination with our oceans and atmosphere to provide the necessary environment for life as we know it to exist.

Since the Sun's diameter is 108 times that of the Earth's, we receive only a tiny fraction of the immense amount of radiation it produces. Yet its light and heat make almost all life viable, and it acts as a giant irrigation system for us and all vegetation which flourishes on the Earth. The average yearly rainfall for the entire Earth has been calculated to be 32", or almost 3 feet. This amount of water weighs about 480 million million tons, (1 million million tons is 1 tera-ton, or 10^{12} tons.) Since water has to be lifted by evaporation from every ocean, river, and lake to an altitude of 2,000 to 3,000 feet before it can fall back as rain, lifting this amount of water requires about 220 billion horsepower continuously throughout the year, every year.

But the Sun provides other necessities as well. It provides light and other forms of radiation which turn our sky blue, heat the surface to livable temperatures, and produce the ionosphere which allows us to pursue our excellent hobby—ham radio. So it is only appropriate that we look into this giant nuclear fusion reactor and its effects throughout our solar system.

The Sun Itself

Ever since science began studying the Sun, many theories have been put forth as to the source of its energy. Known to be largely gaseous, scientists thought its tremendous gravity caused its material to be drawn inwardly toward its core. Such contraction would cause extreme heating, along with a tendency for the Sun to shrink. But the calculated rate of shrinkage is such that the Sun could only have lasted about ten million years and still maintained its output.

It was also thought that meteors falling into the Sun helped replenish its fuel supply, but this was also proven incorrect. At first glance, the Sun appears to be a giant furnace where ordinary combustion is taking place, but scientific measurement of its temperatures proves the Sun to be too hot for ordinary combustion to be sustained. Combustion, as we know it, is a process of oxidation, and thus chemical. The Sun's temperatures are far too hot to allow ordinary chemical processes to take place.

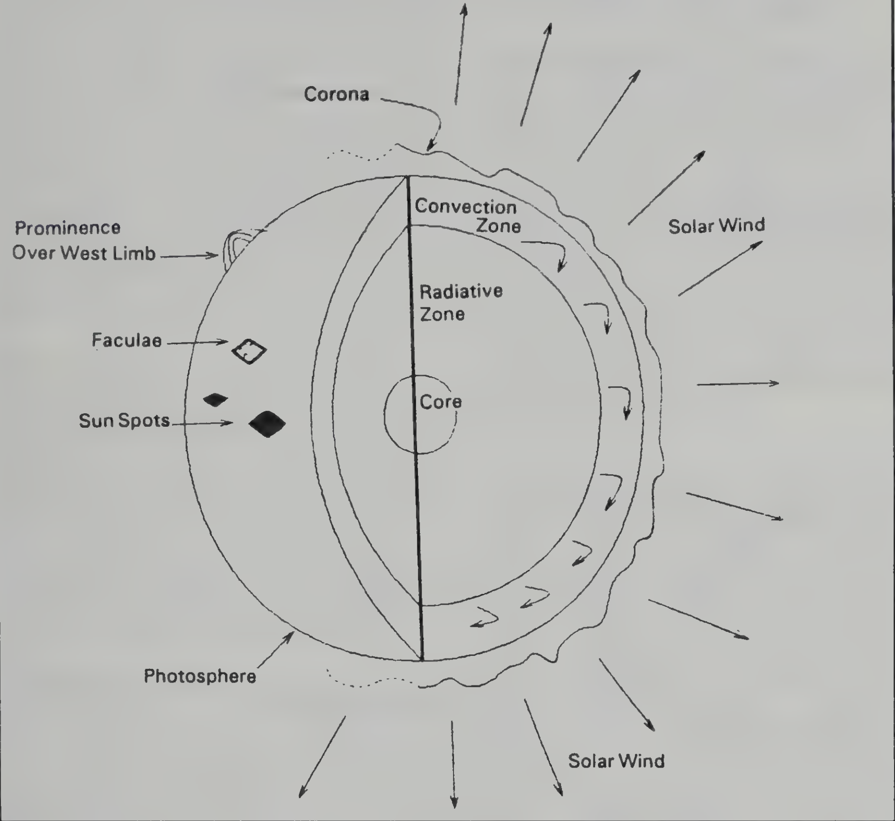
In the late 1920s the "quantum theory" in physics was developed, and it provided scientists with the tools to derive plausible theories for the Sun's immense generation of power. In 1926, the British physicist Sir Arthur Eddington suggested that only sub-atomic nuclear processes would have the ability to generate such power. He reasoned that, at the great temperatures appearing in the Sun's interior, sub-atomic particles would have sufficient energy to smash into one another thus liberating large amounts of energy.

The difficulty here is that like-particles tend to repel one another, and are less likely to fuse into a heavier element and release any energy. In 1928, the quantum theory showed that particles did not have to overcome this repulsion barrier, but could "tunnel" under it. Eddington's theory now became plausible, and nuclear "fusion" processes could be achieved internally to the Sun.

Ten years later, two physicists, Hans Bethe and Carl von Weiszacker independently derived equations giving two possible explanations for the nuclear processes occurring in the Sun's interior. The first possibility, called the carbon cycle, changes hydrogen into helium by using carbon as a catalyst. In this reaction, immense amounts of energy are released. The second is known as the "proton-proton" chain which also changes hydrogen into helium. In this process, stable nitrogen atoms are struck with hydro-

Figure 1

Cross-section of sun showing major features.



gen nuclei (protons) resulting in helium and the release of large quantities of energy.

Figure 1 shows a cross-section of the Sun along with its major features. The temperature of the core is thought to be about 14 million degrees Celsius(°C). This heat passes through a "radiation zone" approximately 292,000 miles thick. Beyond this distance the heat passes through a "convection zone", which is about 140,000 miles thick, to the surface or "photosphere". The photosphere is about 3,100 miles deep and its temperatures range from 4,500 to 5,800 °C.

Above the photosphere, lies the chromosphere. It extends out about 81,000 miles above the Sun's surface. Here the pressure and density decrease rapidly, and the temperature rises from about 4,500°C to 50,000°C. Above the chromosphere, temperatures increase dramatically to meet the transition zone of the "corona". The corona is a diffuse area where temperatures can reach 3 million °C. The corona extends out several million miles, and normally is only visible during either a natural eclipse of the Sun by the Moon, or by an artificial eclipse in which a solid disc is mounted on a telescope to cover the visible Sun.

The Solar Wind

The corona sends a stream of particles, protons, and electrons out into

Ever since science began studying the Sun, many theories have been put forth as to the source of its energy. Known to be largely gaseous, scientists thought its tremendous gravity caused its material to be drawn inwardly toward its core. Such contraction would cause extreme heating, along with a tendency for the Sun to shrink. But the calculated rate of shrinkage is such that the Sun could only have lasted about ten million years and still maintained its output.

Figure 2A

Distortion of the magnetosphere by the solar wind.

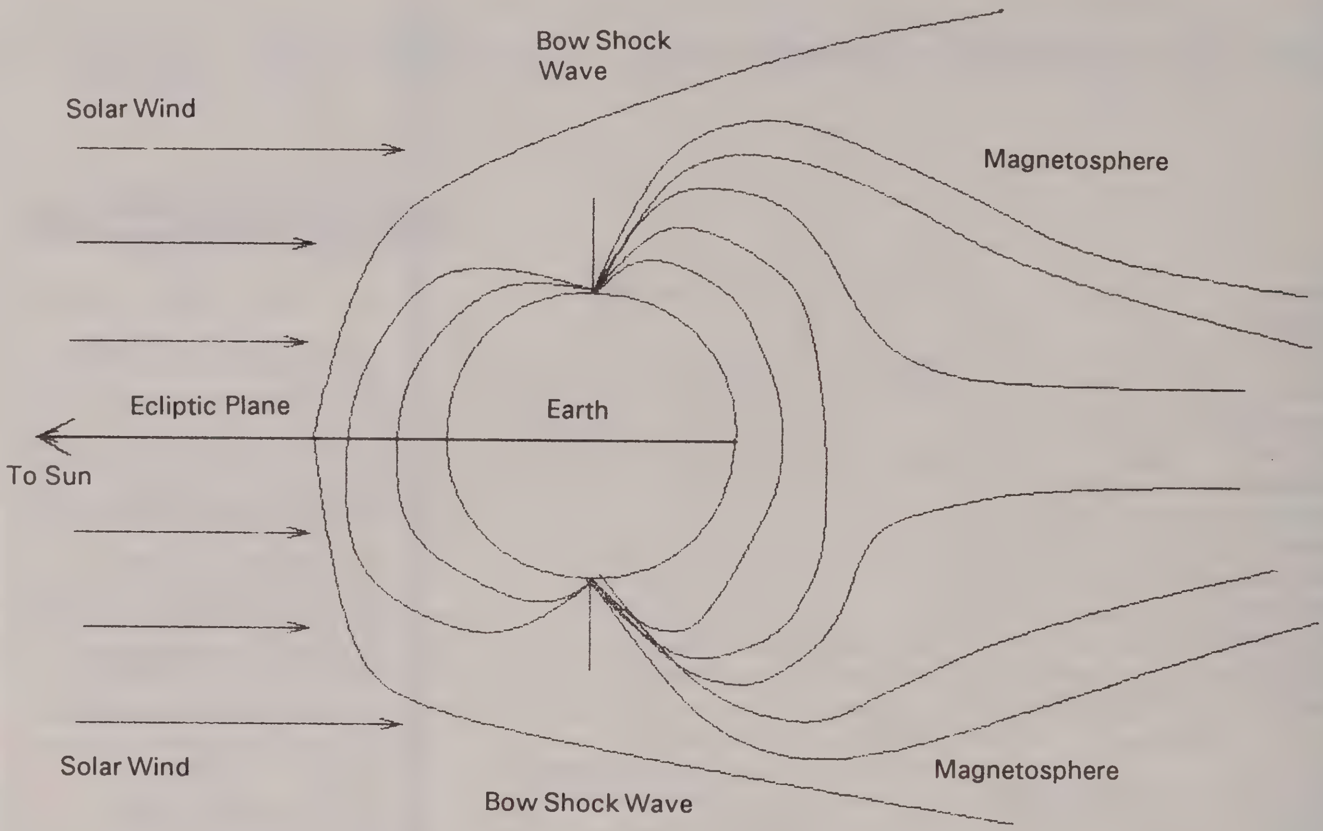
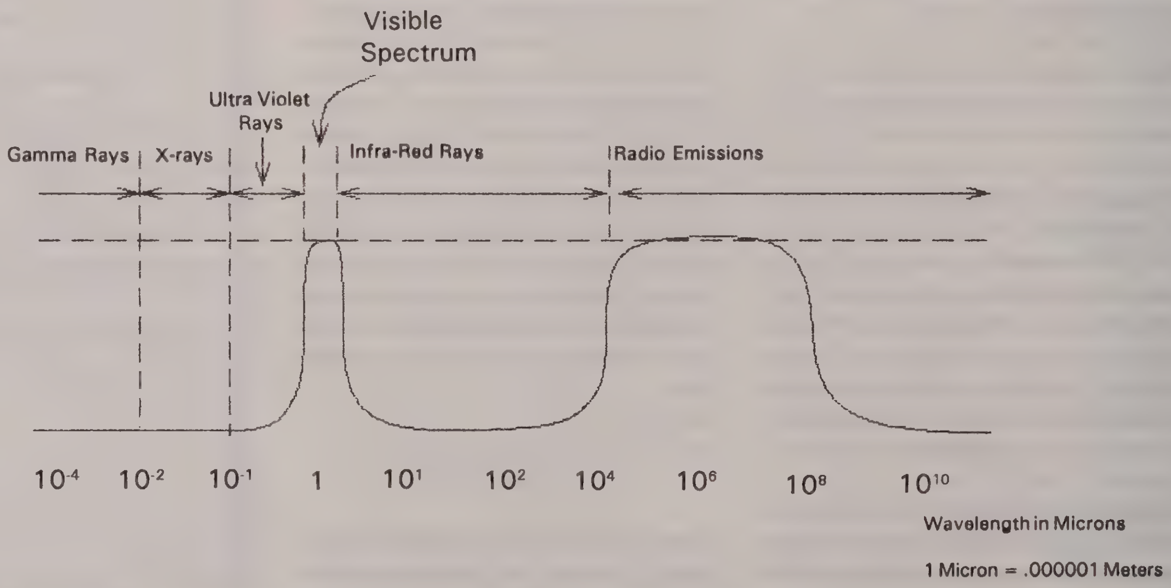


Figure 2B

Spectral composition of solar radiation (emphasis added to visible spectrum and radio emissions).



the solar system at velocities of 186 to 372 miles per second(mps). This "solar wind" also includes electromagnetic radiation, in the form of X-rays, intense ultraviolet rays, and cosmic rays, which travel at the speed of light. The solar wind extends well out beyond the planet Jupiter. Note that the solar wind is not an "atmospheric" type wind caused by pressure differentials such as we experience daily here on Earth. Rather it can be viewed as an "energy dump", or ejection, of the electromagnetic radiation and particulate matter.

The force of the solar wind fluctuates according to changes in the magnitude of ejected radiation and particulate matter. The solar wind is believed to extend out some 310 million miles from the Sun. Here its force has dwindled to the point where it cannot resist the emissions—both radiative and particulate—from other stars.

The solar wind has an effect on the Earth's magnetic field as it sweeps by on its way to outer space. Our magnetic field, or "magnetosphere", is sufficiently strong to prevent much of the solar wind from penetrating deeply into it. However, it is distorted by the solar wind, and Figure 2A shows this basic effect. Some energetic forms of radiation and particles do manage to penetrate to depths between about 400 to 40,000 nautical miles(nm) and are trapped in this region. We know them as the Van Allen Belts, after Dr. James Van Allen, the physicist who discovered them.

Since the Sun is a gaseous body, its rate of rotation varies with latitude. Its polar regions rotate in approximately 35 days, while the equatorial regions take only about 27 days to complete one revolution. This difference causes the solar wind to have changes in magnitude, and adds a spiraling motion to the ejected particles. It also is believed to be the cause for other solar phenomena such as sunspots, flares, faculae (1, 2), and other prominences visible on the Sun's surface.

Solar Emissions

The primary emissions we are aware of are heat and light. But there is a range of other emissions which we cannot always see or feel immediately. These "dark" emissions extend across the electromagnetic spectrum from gamma-rays at the upper end, to low-frequency radio waves at the lower end. Figure 2B shows a simple graph of this spectrum, with the visible portion as well as the radio portion amplified for reference.

Without giving it much thought, many people make daily measurements of some of the "dark" radiations. We use thermometers to measure local temperatures which are directly related to the "infra-red" radiation from the Sun. People who go to the beach to get a tan find themselves using the "ultraviolet" portion of the spectrum. Often without realizing it, they wind up with a "sunburn" which can be dangerous if not controlled properly. The human skin is not a good measuring device since its response time is much too slow for such purposes.

I hope this brief review of our solar "big brother" will whet your appetite to delve further into the interesting world of propagation. Next month we'll look at sunspots, a major contributor to more than just propagation. Some interesting aspects of sunspots affect not only the ionosphere, but non-ionospheric propagation as well. Stay tuned— we've just begun an interesting journey.

References:

1. Lee, J.G., "An Introduction To Radio Wave Propagation", 1991, Bernard Babani (publishing) Ltd., London, England.
2. Lee, J.G. "Flocculi, Faculae, and Radio Blackouts", Radioscan Magazine, (now Amateur Communications) October 1991. ■

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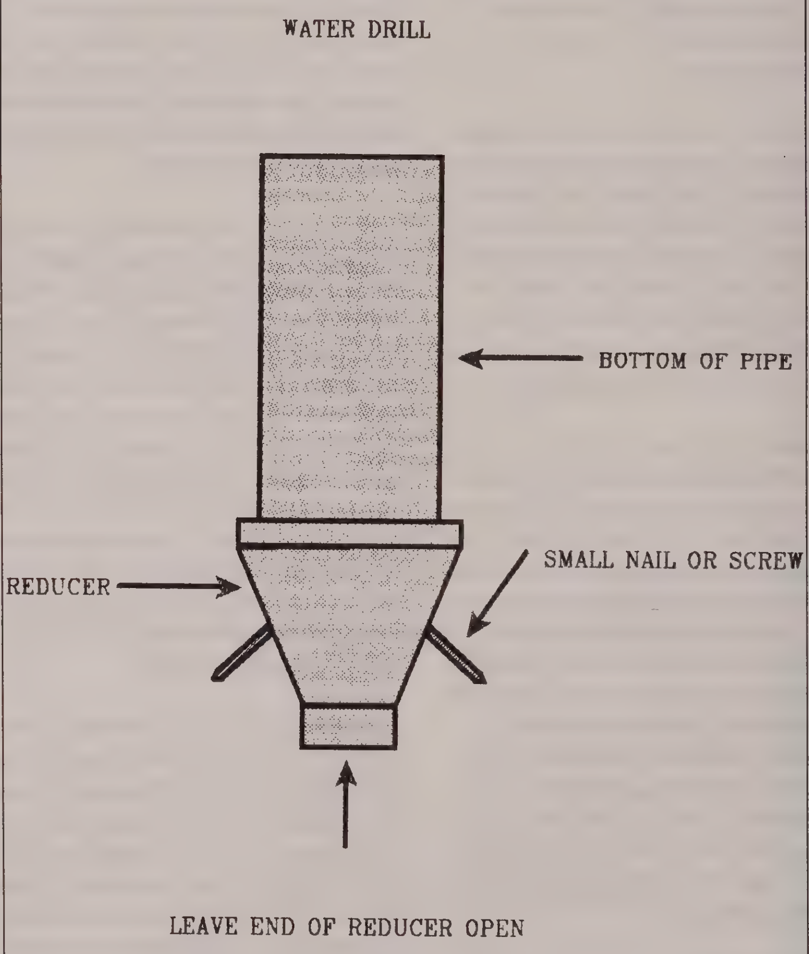
A Ground System
For The Ham Shack

By Richard Morrow, K5CNF

One of the first things that any ham must keep in mind is the definite need for a good ground and lightning protection. With a potential of somewhere in the 500 million + volt range and a current potential of 4,000 to 5,000,000 amps, a lighting bolt is definitely not a good accessory for any ham shack. They are *very* expensive to feed and will eat your electronics stuff, house and anything else that they feel like. Moreover, they cannot be housebroken. And not only that, you can't pet one either. So a good ground is needed to keep out such unwanted visitors.

A good ground is not too hard to get in some locations, in others it can be very hard to find. Along the Gulf coast and other salt water coastal areas, a good ground is usually not very hard to find as the water table is not very far below the surface. In locations where the soil is only a thin layer over bedrock, or in desert sand conditions, a good ground is not easy to find.

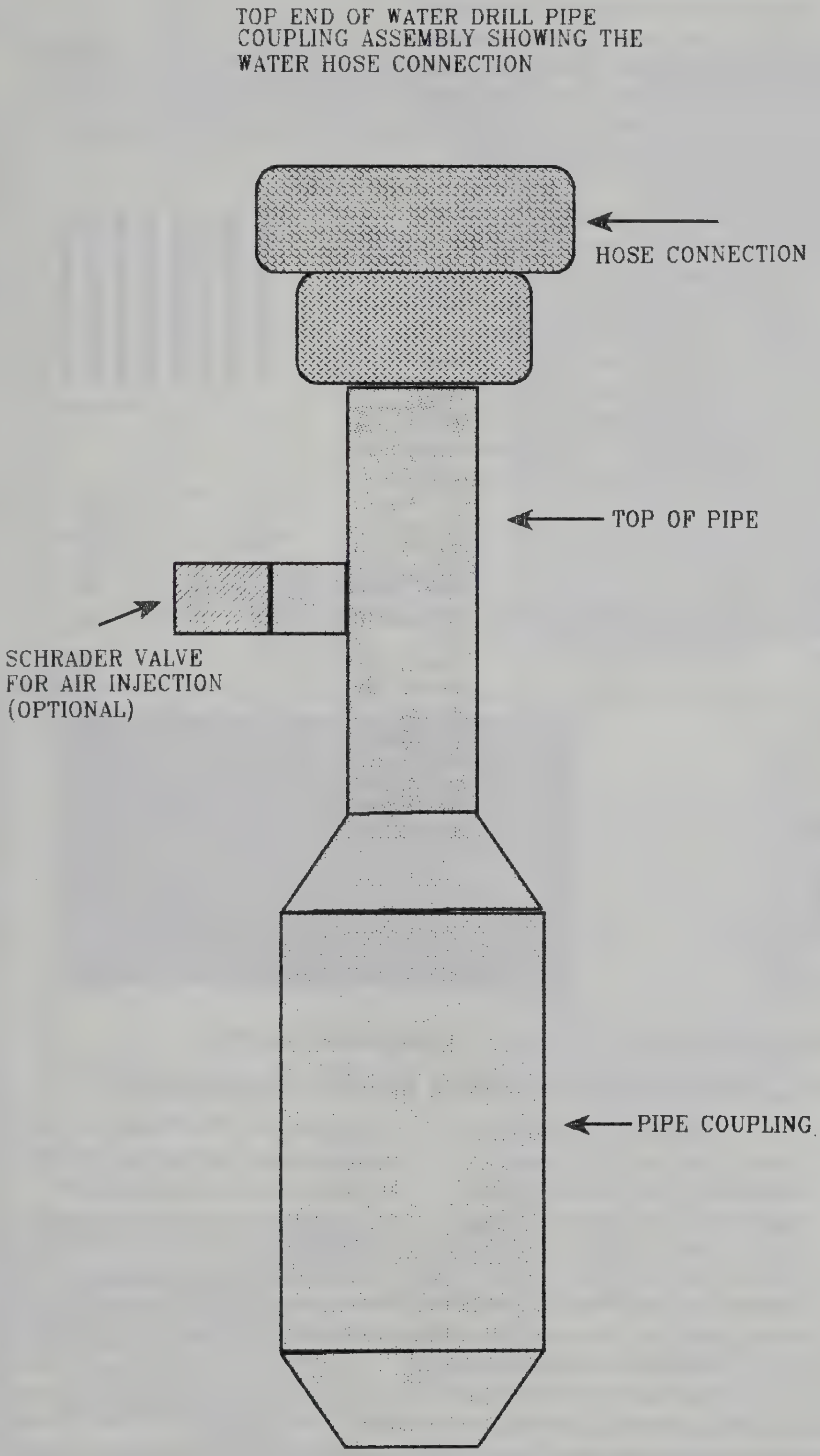
Figure 1



Down through the years there have been many articles on how to get the best ground. All of them state the need for a good deep ground rod, usually several ground rods separated by several feet and tied together with a good soldered or welded weather proof connection. All of the equipment that goes to the ground rods is tied together by a prime ground terminal. In other words, everything goes to a common point then that point goes to the ground system through a heavy low loss conductor.

Getting the ground rod into the earth deep enough to do some good, has been a source of discussion good for hours of idea swapping. One of the best methods that can enable a lot of ground rod to be buried very deep with minimal effort—but a lot of mess—is to use copper pipe and make it into a water drill. By using the water pressure to do nearly all of the work, a fairly long piece of pipe can be pushed into the ground. But you

Figure 2



will get wet—along with anything in the immediate area.

To make a water drill, first determine how far down you want to go with your ground pipe. Then go to a building or plumbing supply store and see how much copper pipe you can afford to buy. Twenty feet of 3/4 pipe isn't too expensive, but 1/2 will do. If you can get it in 5 ft. lengths it is easier to handle. Also you need to get enough pipe couplings so that you can join the pipe together as you go deeper and, last but not least, a reducer from 3/4 to 1/2 or whatever size you need to fit your pipe. The last thing you need is a hose coupling that you can use to connect your garden hose to the pipe.

You will need solder and a torch of adequate size to solder all of this together and enough heavy gauge wire to get from your shack to the ground system when you are finished installing the pipe. A good source of heavy gauge wire is a welding supply house, the cable is flexible and easy to work with. Now that you have everything in hand, construction can commence. If you are not too sure of your ability to solder pipe, take time to practice, as a good solid electromechanical connection is essential.

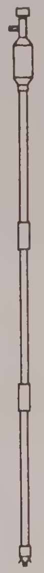
At this time you can do a few things that might make life a little easier on you as you push the pipe into the ground. First, if you want to take the time, get some small short nails or sheet metal screws. Next, drill holes in the reducer around the diameter of the reducer and solder the nails into the holes points sticking out, or screw the sheet metal screws into the holes. The screws or nails shouldn't stick out anymore than 1/8 to 3/16 of an inch past the pipe. Figure 1 illustrates this. The nails or screws will help to dislodge stubborn objects and cut through the earth, allowing the water to wash whatever it is, out of your path to a good ground. This also ensures adequate clearance between the sides of the pipe so that the water can flow up past the pipe and the sides of the bore hole easily.

The other thing you can do is to add a fitting to the coupler that you solder the hose connection to so that you can inject a small amount of pressurized air into the water from a small compressor like a lot of people carry in their cars to pump up a low tire. Not a lot of pressure is needed as you don't want to inject air into your water lines. Figure 2 shows this coupling and air fitting. The air bubbles will help move the mud out of the way as well as carry the mud up to the surface faster than if the water alone had to do the job. Depending on your particular soil type, you might keep these two suggestions in mind. They do make it easier to sink the pipe into the ground. Incidentally, this technique is the way that oil wells are drilled, only a special type of mud is pumped into the bore hole to flush the cuttings out of the way of the drill bit and speed up the drilling process.

Assuming that you have everything ready and have your soldering skills squared away, the first thing to do is to solder the reducer on a section of pipe, then solder a coupling to the other end. Then drill a hole through the coupling and pipe and put a sheet metal screw or two through both the pipe and coupling. This ensures the mechanical integrity of the connec-

Figure 4

THREE SECTION GROUND ROD



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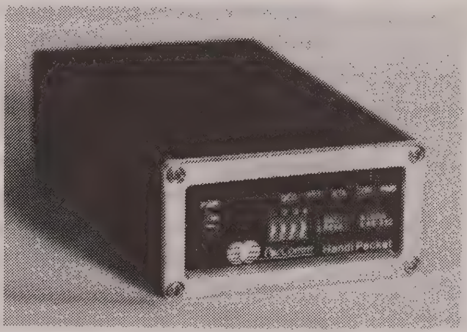

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FINISHED GROUND ROD INSTALLATION

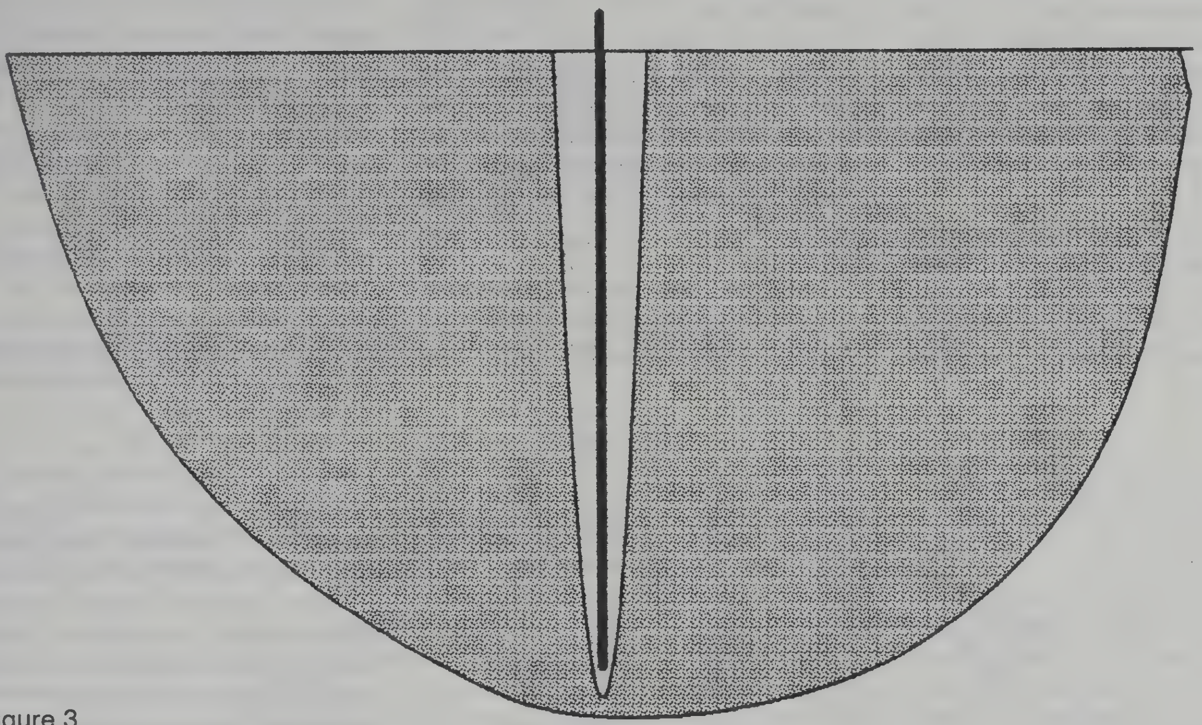


Figure 3

tion, as the sections have to endure a lot of pulling, pushing and twisting as you sink the pipe into the ground and sometimes solder joints will fail. It is no fun to try to retrieve ten feet or so of pipe that is several feet below the surface in a water filled muddy hole that is too small to stick your hand in. In the oil well drilling business, this is known as going fishing and costs too much to think about.

Next, solder and screw another pipe section and coupling. Do this to the rest of your pipe sections so that you have all of the sections of pipe with a coupling soldered and screwed together on one end. *Do Not Solder All Of The Section's Together!* Just put a coupling on one end of each pipe section only. Now you are ready to begin and make a first class mess. Be prepared to get wet and muddy, as it is unavoidable.

One of the first things that any ham must keep in mind is the definite need for a good ground and lightning protection. With a potential of somewhere in the 500 million + volt range and a current potential of 4,000 to 5,000,000 amps, a lighting bolt is definitely not a good accessory for any ham shack.

Prepare your site by cleaning all weeds, grass etc., away from where your ground pipe is going to be so that you will be able to see what you are doing. Next, move anything else away that cannot stand the onslaught of mud and water that will be flying through the air for the first few seconds or minutes. Put on a bathing suit or rain suit. Take the first section of pipe in hand and hook the garden hose to it. Hold the pipe as close to vertical as you can, with the reducer end about 2-3 inches from the ground and turn the water on and the air—if you are going to use it.

Now start to push the pipe into the ground. A pair of vice-grips or channel lock pliers will help you hold onto the pipe. As the pipe starts to sink into the ground, twist it back and forth so that the nails or screws will cut the wet ground (mud), and let it be washed away. A lot of water should start to flow up around the sides of the pipe and as you go deeper the color and texture of the mud coming up should change as you cut through the different layers of earth.

When the pipe gets to within a foot or so of the ground, turn off the water, take the hose connector off and solder another section of pipe onto the section in the ground. Don't forget to put a screw through the pipe and coupler. Hook up the hose connector to the new section of pipe, turn on the water and air again and start drilling. Keep this up until you have gone as deep as you want to or run out of pipe, or hit something too hard to cut through, or get too tired to continue.

If you should hit something hard after you have gotten down ten or twenty feet or so, by pulling up about three or four inches and letting the water and air wash the dirt around in the bottom of the hole for a few minutes, whatever it is might be loosened enough to move out of the way. You can also allow the pipe to slide off at an angle in order to enable you to keep on drilling. Usually there is enough flex in ten or twenty feet of pipe to allow up to a foot of deviation from vertical so that you can avoid an object. One thing is for sure, you will not be drilling a dry hole.

When you have only one section of pipe left, stop when you get to a good place to do so and solder your ground wire to this section of pipe, then solder and screw this last section of pipe to what is already in the ground. Then commence to sink the last section to within three or four inches of the surface. If you want to lower the ground resistance some, one thing that you can do is to sink another ground pipe several feet away from the first one. As a matter of fact, several shorter ground pipes in a circle around the first deep pipe will contribute a lot to lowering the total ground conductivity. Be sure to solder all of the pipes together with heavy gauge wire.

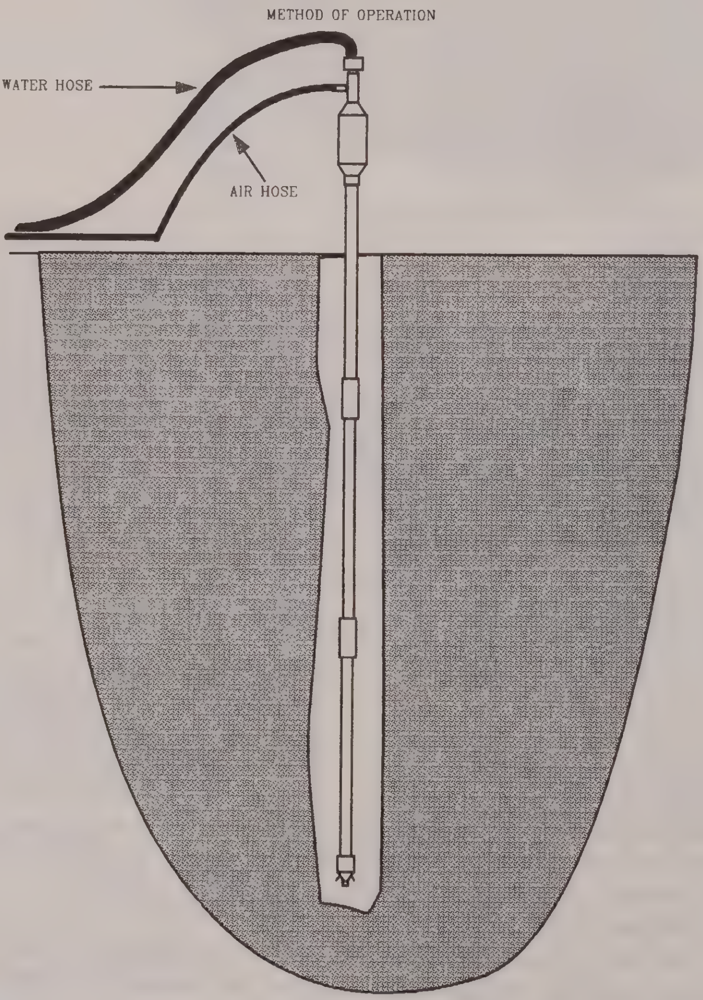


Figure 5

If you chose to add several more pipes, all that you will have to do is to buy what you need and start drilling again. Rest assured that the more pipe that you sink into the ground, the better off that you will be. Broadcast stations spend thousands of dollars on the ground system for a single tower system and it pays-off in the form of an improved signal.

Besides, keep in mind "Where Zeus throws, every thing glows". So keep that uninvited high voltage guest out of the house—ground everything. Also disconnect and unplug everything when you go off the air. Some hams have ac switch boxes that shut everything off with the throwing of one switch, which is good, but one direct hit on the ac mains right outside the house can melt down the switch box and the rig too. So unplug the rig and disconnect the antenna, and ground the coax or whatever that goes to the antenna.

One thing that you need to remember, even if you have a tower and that tower had a concrete base—lightning has been known to blow up concrete bases. So your tower needs to be grounded to a good ground system instead of relying on a concrete base for ground return.

"'Tis better to be safe than melted." ■

What Can I Do With A Noise Bridge?

Part I

By Ralph "Ty" Tyrrell, W1TF

Most of the time, the wattmeter's forward and reflected power readings are enough to check your antenna system. The wattmeter works well, as long as there is no problem. A confirmation of "all is right", with the antenna and feedline system, is all that you usually need. But what to do if the only reading that you get is that the best VSWR is 2:1? Is the feed point impedance 25 ohms or 100 ohms? Is the impedance all resistance or a combination of resistance and reactance? The wattmeter does not give you answers to those questions. A low cost and versatile piece of test equipment, that will give you those answers, is the noise bridge. The noise bridge does not require that a signal be transmitted, therefore you can use it on any frequency. Check out those antennas that you made for the shortwave broadcast bands. Since you are not transmitting a signal, you do not even need a ham license to use a noise bridge. The front and back panels of a typical noise bridge are shown in Figure 1. A coaxial cable (any length) must be connected from the noise bridge connector labeled "receiver" to your station receiver. The circuit you want to test will be connected to the connector labeled "unknown". To make a measurement, you tune the receiver to the frequency on which you wish to take the measurement. Turn off the AGC circuit in the receiver if possible. Turn on the noise bridge and adjust the R and X knobs until you have the minimum amount of noise in the receiver. Then read the value of R and X from the dials. There will be more on how to use the noise bridge later.

What Makes A Noise Bridge Work?

First, let's look at the Wheatstone bridge. Figure 2 (top) shows the bridge circuit. If R1 and R2 are the same value, then the voltage at their junction is one half of the applied voltage. If R3 and R4 are the same value, then the voltage at their junction is also one half of the applied voltage. The meter will have the same amount of voltage at each terminal. There will be no current in the meter, therefore no meter deflection. The bridge is balanced. Figure 2 (bottom) has the same R1 and R2 values. However R3 has now a calibrated potentiometer. R4 is replaced with an unknown value of resistance. If R3 is adjusted until the meter again has no deflection, the bridge is again balanced. The value of R3 and the value of the unknown resistor must be the same. Read the value on the calibrated dial of R3, and you will know the value of the unknown resistor.

The Wheatstone bridge works at DC. To measure impedance at radio frequencies, there needs to be a signal source. The noise generator is that source of signal. Since the noise is at all frequencies, and we want to make a measurement at only one frequency, the receiver is used to select that frequency. The receiver is also the detection device. It replaces the meter of the basic bridge circuit. Figure 3 shows the circuit of a noise bridge. Since the measurement is to be made at radio frequencies, there are two adjustments to make to balance the bridge. R1 is adjusted to match the resistance value of the unknown circuit. C2 is equal to one half the value of C1. If the unknown load has no reactance then the bridge is balanced when C1 is at mid scale. When there is reactance in the unknown load then balance the bridge by adjusting C1 until the reactive part of the load is balanced. Usually it takes readjustment of both R1 and C1 until the best balance is made. The value of the resistance part of the unknown load is read directly from the dial on R1. The reactive part of the load may be calculated from the value read from the dial on C1. The exact formula for this calculation will be different for each brand of noise bridge. The value you get from this formula is the reactance at 1 MHz. Now divide by the frequency that the receiver is set to get the true reactance.

Measure The Length Of A Feedline

There are many reasons to measure the length of your feedline. If you are going to compare the loss in your feedline with the matched line loss of new coax then you need to know the length of the line you routed through the walls and up to the attic. If you are going to use a phased antenna system you will have to precisely measure the electrical length line.

To measure the length of the coax line connect the line to the unknown connector on the noise bridge. The other end of the coax should be open (no line termination), or shorted. Set the X dial to zero. Set the R dial to a low value (0 to 5 ohms). Start tuning the receiver at 30 MHz. Tune the receiver down in frequency until you have minimum noise in the receiver. Record the frequency. Continue tuning down until you find the next null in noise. Continue this until you have 3 to 5 measurements.

Line length may be calculated from:

$$\text{Length(meters)}= \frac{155}{FH-FL}$$

$$\text{Length(meters)}= \frac{492.1}{FH-FL}$$

Where FH is the higher of a measurement pair
FL is the lower of a measurement pair

The table shows measurements I made on a cable in my home. The other end of the cable was shorted.

The data in columns 1 and 2 gave me lengths of 26.91, 26.93, 26.84 and 26.84 meters. These are the electrical lengths. To convert to physical length multiply by the cable velocity factor. Note how close all the readings are to each other. The first set of measurements I took are in columns 3 and 4. They gave me lengths of 26.56, 26.32, 25.65 and 23.64. Notice how these measurements are progressively changing. This is the result of a bridge that had the X dial misaligned. Make sure you get consistent results, if not, check the bridge calibration.

Measure Resonant Frequency Of An Antenna

The noise bridge must be installed at the point where you want to take a measurement. The length of a coaxial cable will transform impedances by an amount that is proportional to the length of the cable. The only cable length that does not make an impedance change is a cable equal to one half wavelength (or an integral multiple of that).

Since the length of cable between the noise bridge and the station receiver has no effect on measurement, you can connect the noise bridge to the antenna and use the feedline to go to the receiver. Make up a long cord to run from the receiver phone jack to a set of earphones, and do your listening for minimum noise remotely.

Start with the bridge dials set to 50 ohms for R, and zero for X. Slowly move the X dial for minimum noise. Then adjust R for minimum noise. Repeat these adjustments until no further reduction in noise is possible. It is usually easier to notice the minimum noise point if the receiver AGC (automatic gain control) is turned off. Impedance may be calculated by formula if desired.

$$Z= \sqrt{R^2+X^2}$$

Null Frequency	FH-FL	Null Frequency	FL-FL
27.822		27.550	
22.248	5.574	21.902	5.648
16.679	5.569	16.202	5.700
11.092	5.587	10.354	5.848
5.505	5.587	4.008	6.346

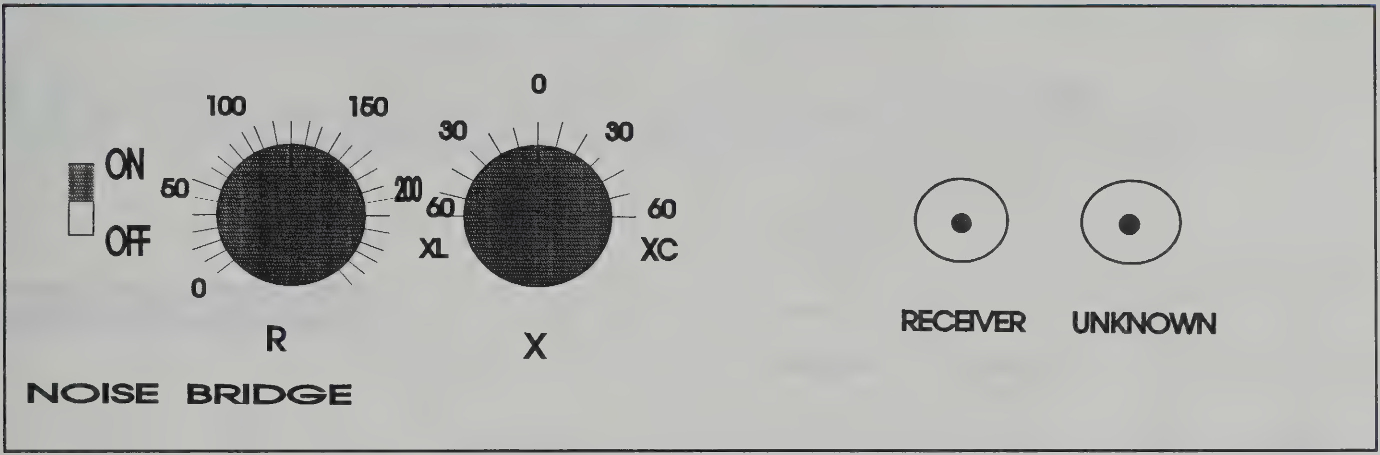


Figure 1

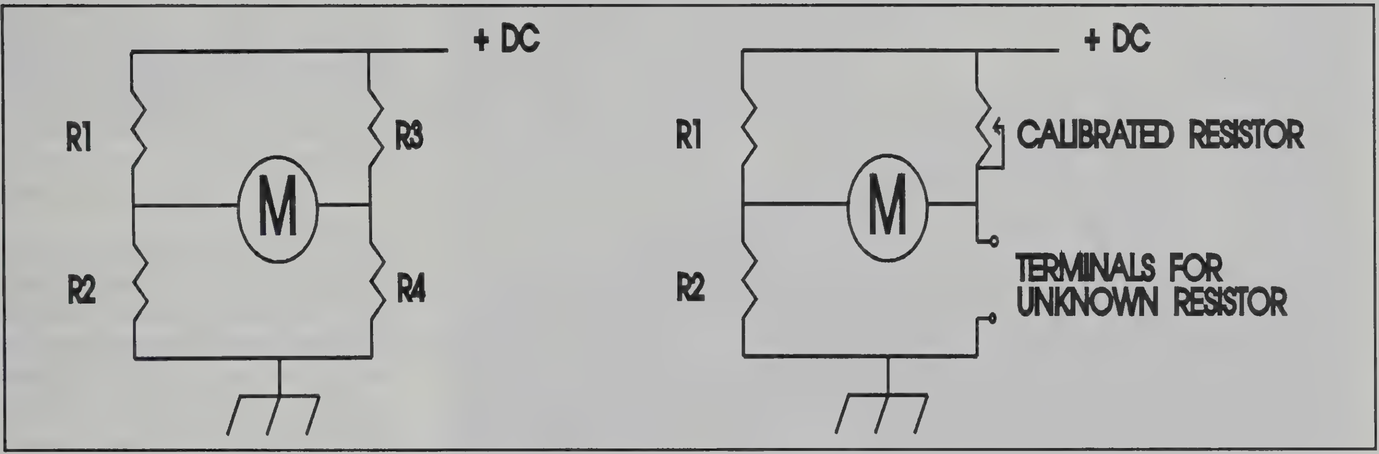


Figure 2

Where R is the value from the R dial
X is the value converted from the X dial
Z is the impedance

VSWR may be calculated from:

$$VSWR=\frac{A+B}{A-B}$$

Where:

$$A+\sqrt{(R+Z_o)^2+X^2}$$

$$B=\sqrt{(R-Z_o)^2+X^2}$$

Where:
R is value from the R dial
X is the value converted from the X dial
Zo is the characteristic impedance of the line (usually 50 ohms)

If the X dial reading is positive, (on the XL side of the dial) then the antenna is too long. To find the resonant point of the antenna, reset the X dial to zero. Go to the receiver and tune down in frequency until you get minimum noise. If your resonant point is too far from the desired operating frequency then adjust the length of the antenna, (shorten in this case) until the desired resonant point is achieved.

Measure Frequency Of A Series Tuned Circuit

The circuit to be measured should be connected to the unknown socket, as shown in Figure 4. Set the X dial to

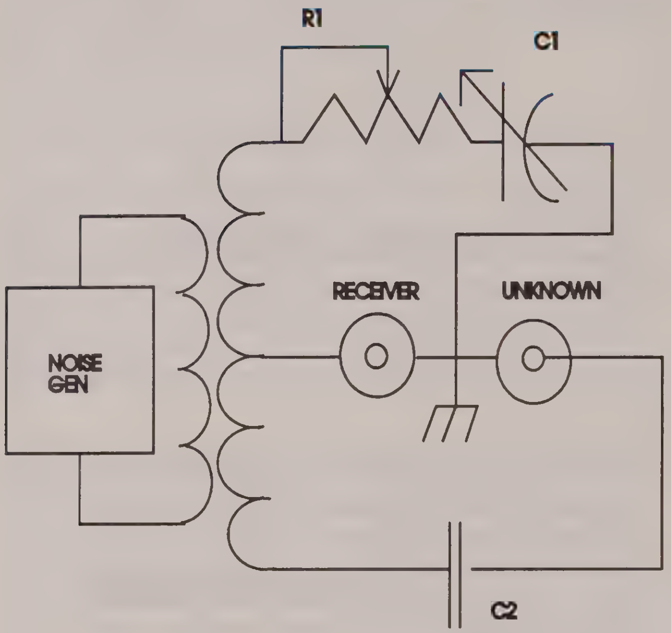


Figure 3

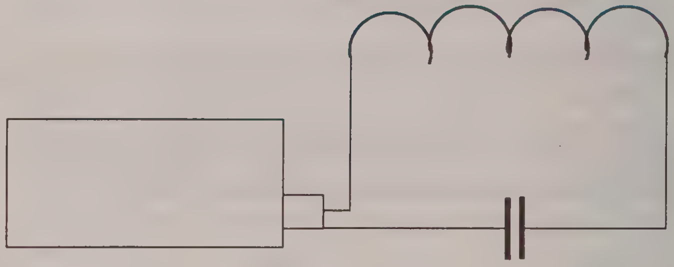


Figure 4

zero. Set the R dial to a very low value (about 5 ohms). A series tuned circuit will have very low impedance. Tune the receiver until minimum noise is heard. It may be necessary to readjust the R dial to find minimum noise. Rock the receiver frequency dial back and forth, over the area of minimum noise, to find the center frequency. The receiver dial indicates the resonant frequency.

Test A Feedline

Connect the feedline to be tested to the unknown socket. Connect a dummy load (same resistance as the feedline impedance) to the far end of the feedline. The R value should be very close to line impedance. The X value should be zero. Test the feedline at several different frequencies. Make sure to test the feedline at the frequency, at which it is a quarter wavelength. Maximum change of impedance would occur at this length. If the R varies, or the X moves off from zero, then you may be testing a 50 ohm line with a 75 ohm load or vice versa. Try changing the resistance of the dummy load and retest. Make sure that the R does not vary with changes of frequency, and that the X stays at zero. When that happens, you have a good feedline and the impedance of the line is equal to the value of the dummy load.

Conclusion

The Noise bridge is a low cost, but very versatile piece of test equipment. It gives you specific values of resistance and reactance. You need to know this information before you can adjust an antenna or design a matching network.

Next month more about the noise bridge. Computer programs will be included to take some of the math out of your calculations.

Notes

For more information on the noise bridge and it uses I suggest: Jack Althouse, K6NY's "The Noise Bridge", QST September 1992. Joe Carr, K4IPV's, "Practically Speaking", Ham Radio, Feburary 1989. Joe Carr, K4IPV's, "Practically Speaking", Ham Radio, May 1986. William Vissers, K4KI's, 73 Magazine, May 1983

The author invites your suggestions and questions. Questions may not be answered individually, but will be responded to in future articles. Mail your comments to: Ty Tips, c/o Amateur Communications Magazine, 8250 NW 27 ST, Miami, FL 33122. ■

My Summer Visit to VE7 Land

By Larry R. Luchi, W7KZE

As the school year slowed to an end I started planning my summer vacation to the source of the Alaska Highway. This is Canada's Highway 97 with the start at Dawson Creek, British Columbia. My plans were to visit during the celebration of the Highways's 50th birthday (1942-1992).

My journey began on July 10, 1992, leaving Washington State at Orville, WA, and entering beautiful British Columbia, Canada. The first stop was Kamloops, B.C., a city of approximately 70,000. The primary 2-meter repeater that I used was VE7RLO, 146.96. This was my first introduction to the friendly hams of Kamloops. I spent two days on Shuswap Lake with little luck at fishing but great conversation on 2 meters. My plans were to continue on to Prince George with a stopover at Mount Robson Park.

Mount Robson is the highest point in the Canadian Rockies at 3,950 meters or 12,960 feet, (quite a site for a repeater). The three days of my stay were without any 2-meter or 10-meter contacts—but a very good two-hour white water raft trip down the Thompson River.

Tete Jaune Cache ("T" John) is at the crossroads of Highway 5A and 16, here I checked my fuel and oil. It was 169 miles northeast on Highway 16 to Prince George B.C. however there were no gas stations on the route. I was about five miles out of Prince George before I made contact on their 2-meter repeater, VE7AFG, 146.94. This repeater is linked by 220-MHz to VE7RQL, 147.06 in Quesnel B.C., 102 kilometers south on Highway 97.

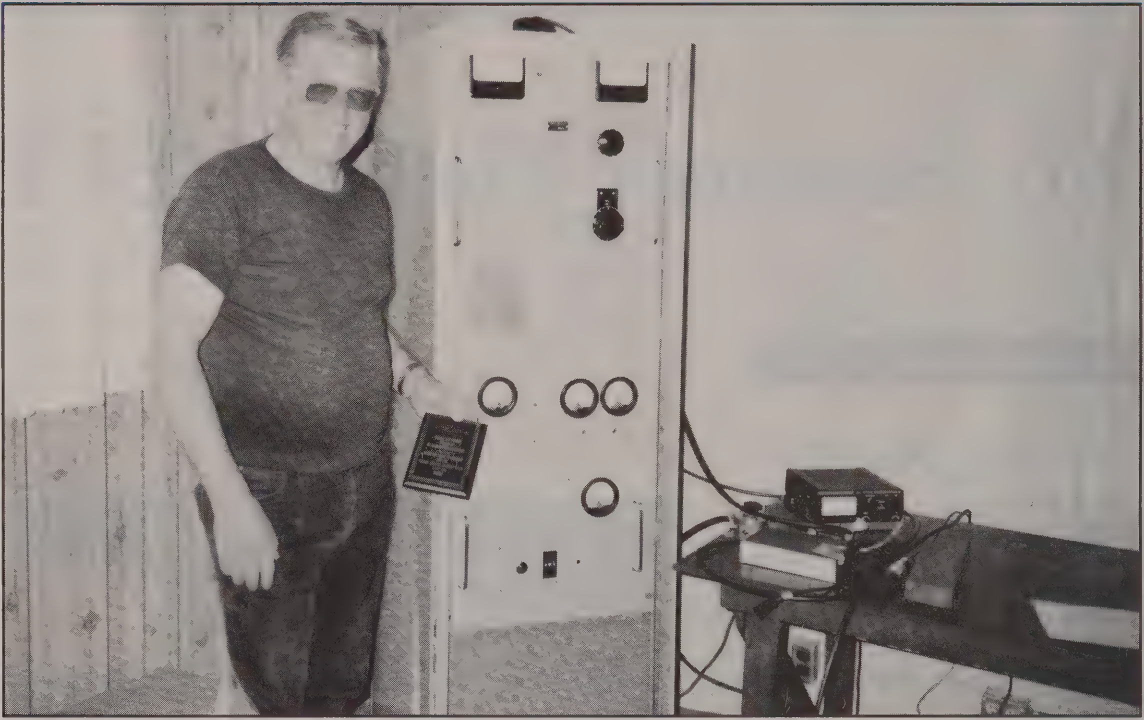
The VE7ZZZ ham shack.

I found a serene camp site just 18 miles north of Prince George B.C. on the Salmon River. My first contact on the 146.94 machine was with Frank Vanderzande, VE7AV. Frank is a Supervisor, Radio Inspector North Central B.C. District. I imagined he was somewhat like an FCC inspector.

Frank invited me to the Prince George ARC breakfast the following Saturday at a local restaurant called Carmel's. There were 24 club members present. I sat next to Chris Walters, VE7EQN. As I am an ARRL volunteer examiner, Chris explained the Canadian amateur licensing process to me.

Operating in Canada

In Canada there is only one certifi-



Frank, VE7AV holds an award in the 20-meter room.

cate available for the amateur service: the amateur operator's certificate (not a license). The Entry level is called The Basic Qualifications. This certificate must be obtained before the three higher levels of qualifications.

The Basic Qualification provides the foundation for operation in the amateur radio service. To obtain the amateur operator's certificate with Basic Qualification, a candidate must successfully complete a theory/regulations/operating procedures examination.

The holder of the amateur operator's certificate with the Basic Qualification may: operate on all frequencies above 30 MHz, using all classes of emissions; use a maximum of 250 watts DC transmitter input power; and build and operate all station equipment, except for "homemade transmitters."

The Basic Qualification certificate is very similar to our No-code Technician class license.

To upgrade to what we call the Tech-Plus, an individual who holds the Basic Qualification must pass a Morse Code test of sending and receiving at a speed of not less than five words-per-minute for three consecutive minutes. A successful candidate may then operate in all amateur frequency bands below 4 MHz, in accordance with the Canadian General Radio Regulations.

The next level of Qualification is similar to our General class. Candidates for this qualification are tested on sending and receiving Morse Code at a speed of not less than 12 wpm for three consecutive minutes. Amateurs who hold this qualification, as well as the Basic Qualification, may operate in all amateur frequency bands, in accordance with the Canadian General Radio Regulations.

This highest level or the Advanced Qualification is for those individuals who have an in-depth knowledge of electronics, a good knowledge of the various types of amateur equipment, and the ability to understand circuits with the intention of effecting repairs and building transmitters.

Amateurs who hold this qualification, in addition to basic privileges, may: build and operate transmitting equipment; use maximum transmitter power of 1,000 watts DC input; sponsor repeaters and club stations; and remotely control fixed stations, including the use of radio links.

(Continued on page 44)

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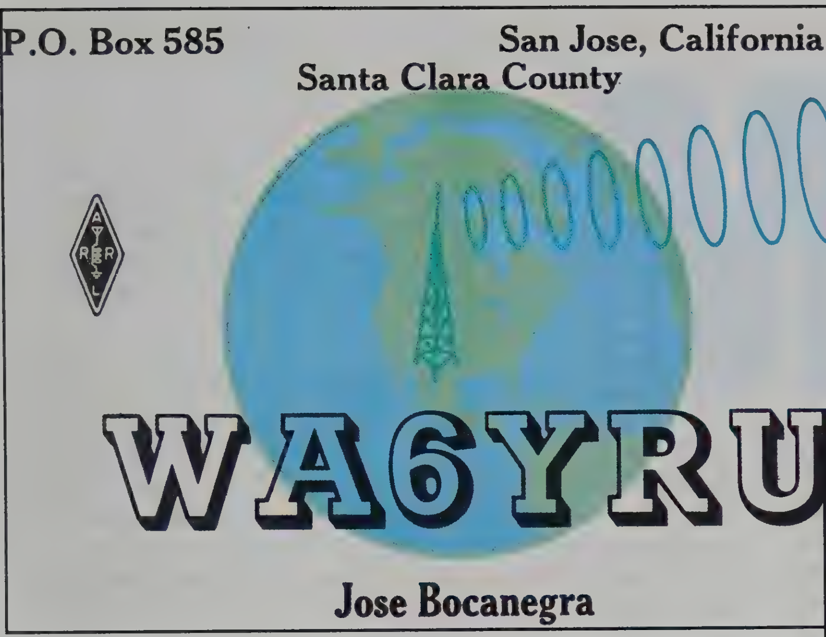

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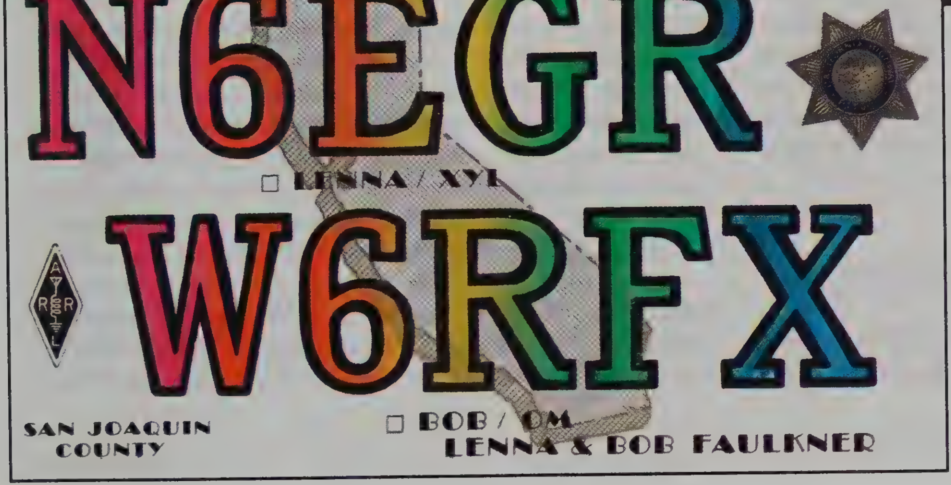

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HAM BRIEFS

By Bob Scupp, WB5YYX

ARRL Proposes To FCC To Issue Military And Club Amateur Call Signs

Ralph Haller, FCC's Chief of their Private Radio Bureau, is in receipt of a letter from the American Radio Relay League, proposing the issuance of club/military amateur call signs. This action came immediately on the heels of Congress and President Bush approving amendments to the Communications Act of 1934. The Communications Act amendments authorize FCC to seek the uncompensated voluntary services assisting in club/military amateur call sign issuance. The Federal Communications Commission lacks budgetary support to do so itself and the legislation parallels that which was needed to establish the VEC system.

The letter from ARRL to the FCC contained details of the League's proposal to implement the issuance of club/military amateur call signs. Applicants would submit a completed FCC Form 610B to the League to check for eligibility requirements and sequentially issue a call sign from a dedicated call sign block. The ARRL would then prepare an FCC Form 660 using the call sign. The FCC Form 660 would be sent to the FCC's Gettysburg licensing facility for an endorsement and mailed to the applicant. ARRL would send FCC a data file on each licensee in a format prescribed by the FCC. A club or military licensee could retain its call sign or change it when the license is renewed or modified. The ARRL would be the record keeper and FCC would have immediate access to these records for enforcement purposes.

VEC System Exam Fees Increase

Both the ARRL and W5YI VECs have announced that they will charge $5.60 per applicant per exam beginning January 1, 1993. This, following FCC's announcement that the maximum allowable exam fee for 1993 will be $5.60 (See January, 1993 Ham Briefs). FCC based the increase upon a 3% rise in the Consumer Price Index set forth in Section 97.527(b) of FCC's Amateur Radio Service rules.

Until the Commission issues its Report and Order on incorporation of Novice testing into the VEC system, Section 97.527(c) prohibiting cost reimbursement for Novice exams is still in effect. FCC will decide sometime later this year whether Novice exams will be a permanent, important part of the VEC system.

ARRL Reaffirms Its Support For Novice VE Exams

The American Radio Relay League has filed reply comments in PR Docket 92-154, proposing to completely incorporate Novice testing into the VEC system. The ARRL and W5YI last year filed separate Petitions for Rulemaking proposing to bring the Novice exam into the VEC system.

ARRL's reply comments addressed several issues since the closing of filing comments. The League argued that since the establishment of the new Technician license class, the number of Novice exams administered has decreased. ARRL also noted that the great numbers of new Technician licensees in 1992 reflects widely available examination sessions. Therefore, incorporation of Novice testing into the VEC system will not be burdensome to the FCC, VECs and VEs. The League clarified that General Class licensees would be authorized to become accredited VEs to administer Novice testing, and would maintain the numbers of VEs to insure exam opportunities. This was in response to comments that exam opportunities in rural areas would decrease. ARRL also stated that the VEC system was a better vehicle in which to satisfy these events and has the capability of doing so.

ARRL Responds To FCC Proposal To Privatize Alien Amateur Licensing

The American Radio Relay League filed comments in response to FCC's proposal labeled PR Docket 92-167. The self-motioned FCC proposal would transfer amateur alien licensing from the FCC into the VEC System. The ARRL commended the FCC for trying to streamline this process, but wants consideration of another alterative method of achieving the same objective.

The FCC Notice of Proposed RuleMaking was originally released on August 6, 1992. It proposes to incorporate reciprocal licensing with other countries by incorporation into the VEC System. A 20 question written exam, designated Element 5, would be administered to a foreign amateur licensee at a VE test session. The required minimum pass rate would be 90% and the Certificate of Successful Completion or CSCE would be a valid reciprocal licensing instrument, valid for 60 days. All VECs would be required to keep records on all such reciprocal licensing paperwork.

ARRL points out that while agreeing with FCC's initiative, the Communications Act does not authorize the VEC system to be a "licensing authority." It also argued that there would be an unbearable burden upon the VEC system, just determining a foreign licensee's privileges and documents in foreign languages. In addition, ARRL states there would be logistical difficulties, like taking a written exam in English as opposed to advanced application by mail for a reciprocal licensee with FCC.

The ARRL suggests the establishment of a worldwide common licensing scheme. It states that efforts are underway to have the U.S. join the CEPT or European Conference of Postal and Telecommunications Administrations. The effect would be like having an International Driver's license.

"Ham" Becomes Silent Key

Hiram Hamilton Maxim, son of American Radio Relay League founder Hiram Percy Maxim, became a Silent Key at age 92. "Ham" graduated from Massachusetts Institute of Technology in 1921 and worked for his father at the Maxim Silencer company. When Hiram Percy Maxim died in 1936, "Ham" took over the company. He is survived by three grandchildren, a sister and a daughter-in-law.

The Clinton Administration And U.S. Telecommunications Policy

Now that the Clinton Administration is in Washington, D.C., the President has placed Vice-President Al Gore in charge of our telecommunications policy. When he was Senator of Tennessee, he was responsible for sponsoring the Senate side of the Amateur Radio Spectrum Act and obtaining many legislators' support of this action. What will be in store for the Amateur Radio Service under the Clinton Administration? As the news unfolds please continue to read Ham Briefs.

VHF Activity Report

VHF propagation can and does change for a wide variety of reasons and one of them is geographic location. Certain propagation modes, such as Sporadic E and F2 layer, are "localized", in that the areas covered on a given path are not unlimited. To demonstrate, it has been reported by Jack, N2DXP of Passaic, New Jersey that six meter openings of any kind have been far and few between. But, this may not be representative of six meter activity in other geographic areas.

Tom Glaze, KC4SUS of Miami, Florida was kind enough to spend some time proving this point by telephoning and writing me about his six meter experiences. "I have decided to update you and readers that the 'Magic Band' of 6 meters has been open from this QTH many, many times...", he said in his letter of November 7, 1992. "All contacts were made with my QRP station of 10 watts or less and my home-brewed 7 element cubical quad at 32 ft!" (***Editor's note:*** *See this month's Forum, pg. 6, for details of KC4SUS's activity report.)*

OK, Tom thanks, we are convinced and please keep your reports coming in when you can! For that matter, anyone wishing to contribute to this column is always welcomed to do so.

For Ham Briefs, this is Bob Scupp WB5YYX wishing that all of your news is good news! Until next month, 73 from your *Amateur Communications* Amateur Radio news center. ■

NEWS

K2BSA

The Circle Ten Council of the Boy Scouts of America has agreed to permit MetroCel (A division of McCaw Cellular) to construct a building and antenna tower at Camp Wisdom, Dallas, TX. The building and tower will be shared with K2BSA, the amateur radio station of the Boy Scouts of America. This facility will more than double the building space and provide a taller antenna structure than is presently used. Construction is scheduled to begin this month and will take about two months to complete. (National JOTA will take place in August and International JOTA will be celebrated in October).

If additional information is desired, please contact: Dan Dansby, W5URI, Trustee, K2BSA; 5805 Walla AV, FT Worth, TX 76133; phone (817) 292-5019.

Spec-Com Revises ATV Data Base

Spec-Com is undertaking an update of their Fast Scan Television repeater/remote base information, the USATVS/SCj repeater data base. This updated information will be available to the public to help promote the mode and to provide officials with needed frequency management information. The availability of this information can help reduce conflicts and interference and is provided free of charge. Form 1000-93 is available for your input and may be requested from: The Spec-Com Journal, P.O. Box 1002, Dubuque, IA 52004-1002; fax (319) 583-6462.

The updated data base will be placed on the Electronic Cottage Telephone BBS (319) 556-4536 for the public's reference and record look-up once the revision has been completed. ■

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The Westchester Emergency Communications Association proudly presents its 9th annual hamfest and computer show. **"Wecafest 1993"** will be held on Sunday, March 21, from 9:00am to 2:00pm at the Yonkers Raceway (intersection of I-87, Central and Yonkers AV, Yonkers, N.Y. Walk-in FCC exams at noon. Talk-in on 147.060.

Admission is $5. Children under 14 admitted free with adult admission. Unlimited parking, refreshments and door prizes. For more information, write to Sarah Wilson, N2EYX at the WECA, P.O. Box 831, North Tarrytown, N.Y. 10591-0831.

The 6th Annual York Springfest (ham and computer) will be held Sunday, March 14 at the York Fairgrounds. ARRL VE exams at 8:00am. Talk-in on 146.37/97 and 447.275.

Admission is $4. Unlicensed spouses and children admitted free. Indoor tables, tailgating, food, refreshments and prizes. For information and advanced registration, call (717) 843-7864 or write to York Springfest, P.O. Box 526, Red Lion, PA 17356.

The Brazilian Islands Award *(Diploma Ihlas Brasileras)* is offered to radio amateurs and SWLs who submit proof of contacts with Brazilian islands in any modes, from 160 to 6 meter bands, as of January 1980, and who satisfy all set forth rules. Send a certified official G.R.C. and US$2. Do not send QSL cards. Listen to Brazil DX-Net Sat. and Sun. on 28.530 MHz, 12:00 to 15:00 UTC; Mon. to Fri. on 14.240 MHz, 09:00 to 10:00 UTC.

The list of islands and the rules for the award may be requested from the Manager. Write to Pedro Sirzanink, PP5SZ, Rua Padre Roma 194/ Apt. #704, 88010-090 Florianópolis-SC, Brazil.

The Shore Point Amateur Radio Club will sponsor its 11th annual hamfest, on Saturday, March 6, 1993, at Holy Spirit High School, located on Route 9 (half a mile south of Route 30), in Absecon, New Jersey. Doors open to public at 9:00am. Talk-in on 146.385.

Admission is $4. Unlicensed spouses and children admitted free. Free parking. Tables, food and drink available. For further information, write to SPARC, P.O. Box 142, Absecon, NJ 08201.

The Sterling-Rock Falls ARS is sponsoring its 33rd annual hamfest which will take place at the Sterling High School Field House, 1608 4th AV. VE testing walk-ins between 8:00am and 10:00am only. For testing information write to Robert E. Welch, WY9G, 28445 Woodside Drive, Rock Falls, IL 61071 or call (815) 626-5619 after 6:00pm. Talk-in on 146.25, 146.85 W9MEP repeater.

Admission is $4. For more information, tables or tickets, contact Lloyd Sherman, KB9APW, Sterling-Rock Falls Amateur Radio Society, P.O. Box 521, Sterling, IL 61081. Phone (815) 336-2434.

Hawaii Army MARS will sponsor a Special Event Station commemorating the 50th anniversary of the 442nd Regimental Combat Team.

Operating from Schofield Barracks in central Oahu and from selected other locations throughout Hawaii, the SES will begin at 19:00 UTC, Saturday, March 27 and continue for 24 hours. In addition to voice and CW, digital and satellite activities are planned.

For a commemorative QSL card, please send your QSL card and SASE to Al Shaver, AH6KX, Apt. #608, 84-265 Farrington Highway, Waianae, Hawaii 96792.

CLUB CORNER

The Radio Club of America, Inc. announces tuition assistance financial aid grants to students. Founded in 1909, the club enjoys a membership of over 1,000 professional electronics industry members worldwide. The club awards financial assistance grants to young students pursuing their electronics college education at undergraduate levels. 1993 grants total $11,550.

Most grant recipients are licensed amateur radio operators who are pursuing an education in the electronics industry at the college level and who have a need to receive financial aid to help pay for tuition and related text books. The source of funds for this program is contributions made by club members who have enjoyed a successful professional career in the electronics industry and who wish to assist the newcomers to the industry. This Grants-In-Aid program is the club's major activity.

For more information, contact Kenneth M. Miller, Chairperson: Grants-In-Committee, 16904 George Washington Dr., Rockville, Maryland 20853-1128, or call (301) 774-7709.

The Florida Westcoast DX Ring is an ARRL affiliated club whose members' main activities are contacting DX countries and earning awards. The club meets once a month on the third Thursday of every month.

Past activities include operating multi-operator stations on Field Day, 160 m contests, and IOTA expeditions to Dry Tortugas, Cedar Key and Egmont Key. The Club sponsors the DX Forum at the Tampa Bay Ham Convention.

The club sponsors the following PacketCluster DX spotting network: KO4J, 144.950; N4UYO, 145.510; WB4FNH, 144.970; AB4PY, 145.510.

Full membership is open to Advanced Class or higher licensed Amateurs who hold any DXCC certificate issued by ARRL and includes all club privileges as well as rights to hold a club office and voting privileges including participation in DX-peditions. Associate membership is open to those Amateurs with a General Class or higher license with an interest in DX.

For more information, write to Jani K. Kusmulyana, KO4J, Secretary, Florida Westcoast DX Ring, at P.O. Box 88, Largo, Florida 34649.

Amateur Communications

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AB4RB, A Satellite Ham

By Lourdes Simón

DX News: New CIS Prefixes New 47 GHz Record

By Raúl Gerstel, DK3KC

High-Angle Radiation Antennas

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Changes Coming In The Entry Level Ham License!

By Frederick Maia, W5YI

There can be no doubt that most of the ham radio action—growth and rule making—is at the entry level. And today, the entry level is Technician—not Novice. We admit that statistics make for dry reading, but we really need to look at the ham operator licensing figures to realize what is happening in Amateur Radio. Here are the facts as released by the Federal Communications Commission, Gettysburg, Pennsylvania.

The number of Technician Class amateurs is surging. Today, one-third of all amateur radio operators are Technicians. Just two years ago, Technicians accounted for one in every four ham operators; five years ago it was one in five. As of November 1, 1992 (the latest month for which we have licensing figures) there are 188,749 Technician class operators. While the amateur service census of licensees has increased by one third over the last five years, the Technician class has more than doubled. Newcomers are accounting for most of the growth.

In the last two years alone, the number of Technicians has grown by 25% a year. Even if it slips to a 20% growth rate, there will be half a million Techs within five years...a million within ten. And more Technician Class ham operators than all other license classes combined.

Here's another interesting point. Many beginners are indeed learning the Morse code and upgrading their privileges, but they are doing it after entering at the code-free Tech level. Fewer and fewer newcomers begin their ham radio hobby as a Novice. Comments filed on the No-Code proceeding a couple of years ago said that the Novice and any code-free entry level would be about equal in popularity. It certainly has not worked out that way.

The existence of the Codeless Technician Class has had a profound impact on the Novice Class. Certainly more than the amateur community expected. Three-fourths of all first time amateur radio licensees in Fiscal Year 1992 (which ended on September 30) were Technicians. And the Novice Class has declined to the point where only half as many Novice tickets were issued in FY-1992 as in 1990.

Last summer, the FCC proposed new rules which look toward consolidating the two existing ham radio operator license testing programs. All operator license examinations, except for the Novice Class, are administered in the VEC System. That system has some 30,000 trained and accredited volunteer examiners (VEs) closely coordinated by 18 VE coordinators. Each examination for the Novice Class operator license is administered more informally by two amateur operators selected by the examinee.

Although they do not get another license, Techs who pass a telegraphy exam become "Tech Plus"—for Technician plus code. This upgrade which must be accomplished at a VEC System examination session, allows them to operate on the Novice high frequency bands below 30 MHz. The

VECs keep track of all candidates who achieve Tech Plus and periodically notify the FCC. The VECs Tech Plus Data Base allows FCC monitoring stations to know which Technician licensees are authorized to operate below 30 MHz—especially on the ten meter band.

In separate petitions filed with the FCC in February 1992, the ARRL and W5YI-VEC both recommended to the FCC that all Novice examinations be included in the VEC System in the interest of efficiency. Actually the FCC had already been working on exactly such a proposal since the Fall of 1991.

FCC records show the VEC System is superior. The VEC System screens all amateur radio Form 610 applications before submission to the FCC. The error rate in the VEC System—which processed more than 100,000 applications last year—was less than one percent. On the other hand, applications submitted under the Novice program have an error rate approaching 10 percent.

The better performance of the VEC System is primarily due to improved communications between the FCC, VEC and volunteer examiners. No such channel of communication exists in the Novice testing program. And the VEC System is perceived as a more credible testing system because all VEs must be approved by the VEC and examination records are centrally maintained for FCC inspection if warranted. Unlike the VEC System where pass and fail records are closely monitored, there are no statistics available on Novice examination failures. All Novice examinations are already being administered in the VEC System as a part of other classes of operator licenses.

The FCC proposed to include the responsibility for the preparation and administration of Novice Class operator license examinations under the VEC System with the same conditions that apply to the four higher classes of license. These conditions include requiring each VE to be accredited by a VEC, three VEs for the administration of an examination, coordination by a VEC of each examination session and issuance of a Certificate of Successful Completion (CSCE) to every examinee who scores a passing grade on an examination element.

The FCC proposal also provides for expense reimbursement, that is, a test fee for administration of the Novice examination. The maximum reimbursement currently permitted for coordinating the higher class examinations for 1993 is $5.60. The VECs and VEs are not required to accept reimbursement, however, and this fee could be waived for youngsters if it is determined that such a fee would have an adverse impact on school ham classes and ham radio growth. In any event, the presence of a test fee certainly has not hindered the popularity of the Codeless Technician Class. Ham radio has never been in better health.

Many General Class VEs appear needlessly concerned that their amateur

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Hard to find Macintosh, Amiga, Atari XL/ST public domain amateur radio software available. Send SASE with two stamps specifying computer type for list. WA4EFH, Box 1646, Orange Pk., FL 32067-1646.

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radio testing and training activities would be curtailed if Novice testing falls under the VEC System. Not true. The effect on these examiners is minimal. They would simply be accredited by VECs—the same as Advanced and Amateur Extra Class VEs are now. General Class examiners could participate with existing VEC System teams—or could form their own.

By far, the biggest advantage to bringing the Novice program under the VEC System was not mentioned in the proposal. VEC coordination provides a mechanism for circulating needed examination information. A channel of communication from the FCC through the VEC to the VE is of great importance. VECs routinely keep their testing teams current on exam program changes. Constantly changing rules frequently impact the examination questions.

When the FCC adopted the Codeless Technician last year it was necessary for the Question Pool Committee (QPC) to make several adjustments in the Novice question pool. All VECs were advised of the changes by the QPC so their examinations could be adjusted and VE teams notified.

But Novice VEs could not be notified since their identity was unknown to the QPC. This caused some problems because many examinees used study manuals that contained questions that had been recently deleted from the Novice Element 2 exams. Most Novice level VEs prepare their Element 2 examination from license preparation material available in the publishing marketplace.

In fairness to the examinee and publishers who have study manuals on-the-shelf, VEC System policy is to eliminate (rather than revise or replace) any examination question involving recently amended rules. Bringing Novice testing under the VEC System will allow the VEC to inform the VE of recent changes to question pools and procedures. New Novice question pools are due to go into effect on July 1993.

VECs are already beginning to accredit General Class VEs in anticipation that the proposal will be adopted. This could happen at any time. We invite you to become an accredited volunteer examiner if you are a General or higher class amateur who participates, or wishes to participate, in Novice testing.

To become an accredited VE, simply write to the W5YI-VEC (P.O. Box 565101, Dallas, TX 75356) and request a VE application. You can also phone us at (817) 860-3800 during business hours or (817) 461-6443 at other hours. The two largest VEC organizations, the ARRL-VEC and W5YI-VEC, account for about 85% of all amateur radio operator license testing. Both share expense reimbursement (test fees) with their VE teams.

New Novice And Technician Pools Released

The VECs Question Pool Committee (QPC) has completed work on a newly revised Element 2 and 3(A) Question pool. These two elements make up the sole requirement for the Codeless Technician examination. An ASCII text computer disk and a hard-copy booklet with the new questions, multiple choices and answers identified have been forwarded to all known license preparation publishers and VECs. You may also purchase a copy at low cost if you wish.

The new questions will begin showing up in examinations after June 30, 1993. Massive changes have been made to the Novice and Technician questions and a mechanism is needed to insure that the new question pools are known and used. Hopefully, the Novice testing program will be folded into the VEC System shortly.

The new Elements 2 and 3(A) questions were released to the public in December and you can expect to see the new study guides in the publishing marketplace about May 1, 1993. This will allow a 60 day period between the availability of study material and use of the new questions in examinations. The new pools will have approximately 10% less questions than the current ones.

A new five-character question numbering system is being used beginning with this revision of the Novice and Technician question pools. It will eventually completely replace the old numbering system as the Question Pool Committee revises the balance of the pools. Every question designator is five characters long. Hyphens between characters have not been used.

The first character indicates the class of the question pool: N = Novice, T = Technician, G = General, A = Advanced, and E = Extra. The second character is the subelement number (1 through 9) of the question per Part 97.503(c). The third character is always a letter of the alphabet and refers to the general topic of the question, as specified in the syllabus. There are always as many topics within a sub-element as there are required questions. If Part 97.503(c) requires an examination to have four questions from one subelement, then there will be four syllabus topics within the subelement, and the letters A, B, C and D will be used as the third character for those questions. The fourth and fifth characters are the question number within the syllabus topic. Two characters are always used, even if the numbers that are normally a single digit (a zero is used as the "tens" digit for numbers 1 - 9.) There are no fewer than ten questions within each topic.

For example, question designated "N4C05" would indicate:

N: Novice question pool
4: Subelement 4, Amateur Radio Practices
C: Syllabus topic 3, SWR meaning and measurements
05: Fifth question within this topic

The wording of the Novice and Technician questions were also greatly simplified so as to be on a Junior High and High School level. The wording of every question was changed or revised in some way. Another new feature is that any needed formulas are now supplied rather than the applicant having to memorize them.

The two new pools have been incorporated into an Element 2 & 3(A) Question Pool booklet which contains the syllabus and all (644) Novice and Technician questions, multiple choices and answers. This booklet is available now from the: W5YI Group, Inc. P.O. Box 565101, Dallas, TX 75356-5101 at a cost of $2.50 plus $1 shipping charge. An ASCII text computer disk of all new Novice and Technician questions is $2 plus $1 shipping charge. Both the new Novice/Technician Question Pool booklet and ASCII disk shipped together is $5 postpaid.

In a letter to all Volunteer-Examiner Coordinators, QPC Chairman Ray Adams, N4BAQ said "We recognize the widespread opinion in Amateur Radio that neither 5 questions on Operating practices (2 from the Novice and 3 from the Technician Pool) nor 8 questions on Amateur radio practices (4 from the Novice pool and 4 from the Technician pool) constitute an adequate examination on these subjects to demonstrate qualifications for actually beginning operations as an amateur operator. No judgement by any party on that matter is permitted by the present wording of 97.503(c) which specifies a certain number of questions from each subelement."

Adams asks the VECs to support a petition which will delete Section 97.503(c) from the rules leaving Section 97.523 to control the topics on each exam. This section simply requires that each question pool contain at least ten times the number of questions required for a single examination without specifying the topics.

New Privileges Proposed For Novices

In response to three petitions that involve unrelated changes to the rules for the amateur service 222-225 MHz band, the FCC issued a Notice of Proposed Rule Making (NPRM) in December which:

1. Creates a small new subband where repeaters are prohibited
2. Authorizes frequency privileges to the Novice Class operators in the entire band
3. Allows Novice Class operators to be licensees and control operators of repeaters in the 222-225 MHz band and the 1270-1295 MHz segment of band 1240-1300 MHz

The American Radio Relay League (ARRL) requested in RM-7869 that a new subband be designated at 222.000-222.15 MHz where repeaters would be prohibited, but where all other types of station operation could continue. It said a small segment is needed where experimentation can take place but where frequencies need not be shared with repeaters. While many amateurs believe that this matter should be decided by the local frequency coordinator, the ARRL argues that protection of other types of operation from interference cannot be assured other than by regulation.

ARRL also asked in RM-7868 that the frequency privileges accorded Novice operators be expanded to encompass the entire 222-225 MHz band. It believes that Novice Class operators would benefit from such expansion because they would be exposed to routine types of amateur station operation other than repeater operation. As of November 1, 1992, there were 98,713 licensees holding the Novice Class operator license.

In a petition assigned RM-7888, Dr. Michael C. Trahos, KB4PGC, of Falls Church, Virginia, requested that Novice Class operators be authorized to be licensees and control operators of repeaters in the 222-225 MHz band and in the 1270-1295 MHz Novice subband of the 1240-1300 MHz (23 cm) band. He argues that the amateur service should follow the General Mobile Radio Service (GMRS) and the Private Land Mobile Radio Services (PLMRS) where licensees are authorized to be licensees of repeaters without even being required to pass an examination in proper repeater operation.

The Commission said it believed there was merit in these petitions and asked for comments on the proposed rule changes. "They offer improvements in the operational standards for the amateur service. The availability of a small protected subband at 222.0-222.15 would facilitate experimentation. Permitting Novice Class operators to be licensees and control operators of repeaters and authorizing them additional frequency privileges, would provide an opportunity for Novice Class operators to become proficient in a wide variety of amateur service operations. They would also have more flexibility in selecting the mode of transmission. Choosing the appropriate mode would result in a more efficient use of available spectrum. Comments are invited on the effect that the proposed changes would have on Novice Class licensees."

> ***The wording of the Novice and Technician questions were also greatly simplified so as to be on a Junior High and High School level. The wording of every question was changed or revised in some way.***

The FCC noted that they "...amended the amateur service rules in PR Docket 90-55 (the Codeless Technician class proceeding) based on, among other than things, the amateur community's view that the Novice Class operator license is needed as an entry level for persons who cannot pass the more difficult written examination for the Technician Class license, but who can pass a slow-speed telegraphy examination. Comments are also requested, therefore, on the effect that the proposed changes would have on the current amateur operator license class structure."

Interested parties may file comments on or before February 23, 1993, and reply comments on or before March 23, 1993. To file informally in this proceeding, you must file an original and four copies of all comments and reply comments. If you want each Commissioner to receive a personal copy of your comments, you must file an original plus nine copies. You should send comments and reply comments to: Office of the Secretary, Federal Communications Commission, Washington, DC 20554.

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MARS - We Also Serve

By Lorraine S. Matthew, N4ZCF/AAM3PR

As we end 1992 and turn toward 1993, Florida Army MARS members can march on with pride. At the end of 1992, Florida Army MARS scored another "first" to add to its long list of innovations and ideas.

At the suggestion of Bob Hoguet/AAR4VT, Florida Army MARS became the first state Army MARS organization to service the VA hospitals and homes. When we consider the great sacrifices that the veterans who are confined to these facilities have endured for all of us, it seemed only fitting and proper for those of us who are far more fortunate to give something back. That "something" was the extension of Army MARS services to these men and women. Ordinarily, the status of a retired veteran reverts to that of a civilian according to the regulations under which Army MARS operates. Civilian-to-civilian traffic is not allowed under MARS regulation unless an emergency situation exists. MARS privileges can be extended, however, to any Federal agency. As a result of much consideration on the State level, the Area level, and CONUS level headquarters, it was felt that Florida Army MARS would be properly serving the Veteran's Administration—a legally constituted Federal agency. Thanks for the development and extension of this operation go, in part, to Bob Hoguet/AAR4VT (originator of the idea), Bert Fow/AAA4FL (Florida State Army MARS Director), Fred Neff/AAA3E (Eastern Area Army MARS Director), and Bob Sutton/AAA9A (Chief Army MARS). There were others whose assistance on this project was most helpful and their help is appreciated. It is still too early to determine the effect of this program so far, but one happier person makes the effort worthwhile. This program was conceived as a part of the *Operation: Holiday*'s public relations campaign. It has such merit that it has been accepted as an on-going permanent part of Florida Army MARS.

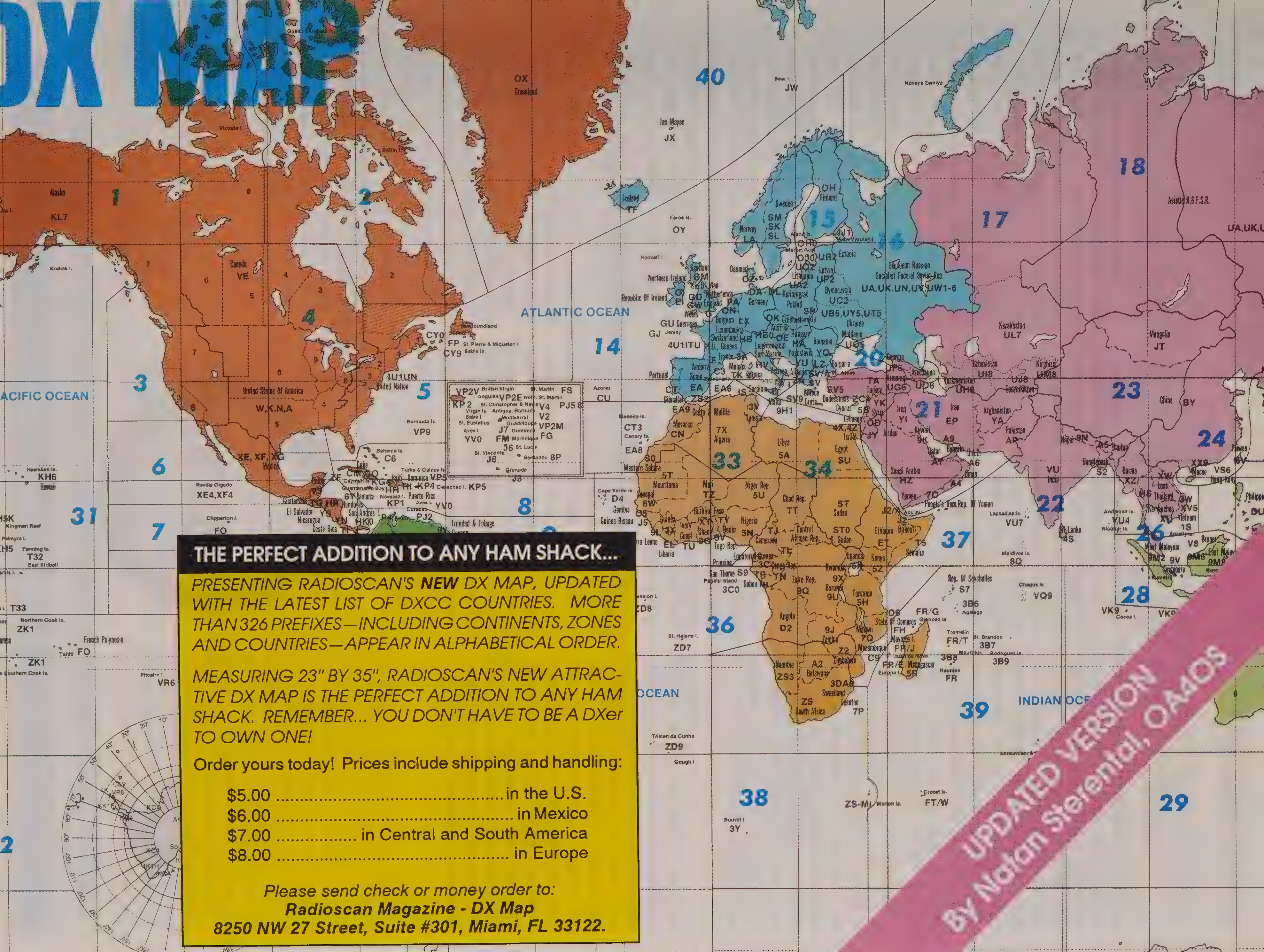
If we accomplish nothing else, those veterans will know that they are not forgotten.

Another program which all Army MARS members are being encouraged to develop is the establishment of 2-meter simplex clusters on the MARS frequencies. Clubs in several states have been contacted with the request that three or four of their members form such 2-meter simplex clusters. The aim of this program is, of course, to create a 2-meter simplex blanket which would cover the entire country. By going simplex, communications capability would be guaranteed in the event that repeaters became unavailable. By going simplex, the vagaries of HF band conditions would be minimized. By going simplex, the volunteer operator would have far less expense and he/she would have far more capability of going mobile should the need arise. The simplex rings would be about ten miles in diameter with each ring interlocking with other rings throughout the state.

At this writing, Army MARS groups all over the world stand ready to participate in the Somalia crisis. Chief Army MARS reports that his office has already been contacted and has been requested to fulfill a role in this mobilization as we did so successfully in the Gulf War.

Chief Army MARS writes, "Army MARS did an outstanding job of supporting our deployed troops and their families during Desert Storm. Based on recent world events, Army MARS is again being called upon to provide, as a minimum, similar morale and welfare support for Somalia. Army MARS must prepare for an anticipated increase in traffic flow throughout the MARS network... It is also

(Continued on page 43)



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(Continued from page 41)

possible that this may include official traffic and we all must be prepared to provide maximum support possible.

"In summary, our soldiers and their families will be expecting MARS to do its part in this humanitarian effort. Coming together is a beginning, keeping together is progress, and working together is success. We are fully confident that as a team effort, Army MARS will again be successful in meeting this new challenge with the effort and dedication that has become the hallmark of Army MARS."

By the time this column is published, the Somalia operation will have been clarified and well defined. While the news at this writing appears to portend an easy operation, the presence of centuries old rivalries and divisions within the population of that country would cause caution to be applied in all measures and operations. I would hope that, as much as the military personnel and their families would like, the military presence is not withdrawn prematurely. We are there to guarantee that food and supplies get through to the starving millions on a continuing basis. General Powell alluded to maintaining an amphibious force in the region to act as a "posse" after the main operation is over. Army MARS is ready and will continue to be ready to guarantee the morale of the troops.

I read with great interest the guest editorial in the *Florida Skip's* December, 1992 issue. It was entitled "The Way The 'Sparks' Fly" and its basic theme is about the joys and values of traffic handling. The entire piece could have applied to Army MARS had the writer (W4SME) had us in mind. He makes several statements that are very applicable to Florida Army MARS. "Florida is *BLESSED* with a *HAM* population that is to a large extent ... *TRAFFIC ORIENTED*... And they say *TRAFFIC HANDLING* is a *LOST* art? Don't believe it! That interest in nets is *WANING*! *MAYBE*, but in Florida ... it ain't *SO*! ... "This is where the action is!

"If there is *ONE* thing we learned from Andrew, it was that Digital Communication does not take the place of the Human Voice, nor does a computer and a modem take the place of the human mind! *TACTICAL* Message Traffic during an emergency via FM and HF operations is the *PRIMARY* modality and the key to successful prosecution of *DISASTER RELIEF*! That is where the *TRAINED*, *SELF-DISCIPLINED*, *COMPETENT*, *AND UN-EMOTIONAL AMATEUR* earns his *MERIT BADGE*! This is the time when '*SPARKS*' fly!"

If we examine the above writer's use of capital letters, we will note that those terms describe the Army MARS radio operators and that scope of activity for which we are so well trained. For all of us, service with Army MARS is an exhilarating experience—exhilarating because we know our strengths. For those of us who are active, this is, indeed, "the time when 'SPARKS' fly!."

To all of Army MARS, a most productive 1993. Let those sparks fly throughout the year wherever and whenever we are needed. ■

ATTENTION

Would you like to share a ham photo with your friends and colleagues?

Send your favorite picture to Amateur Communications and we will publish it in our magazine.
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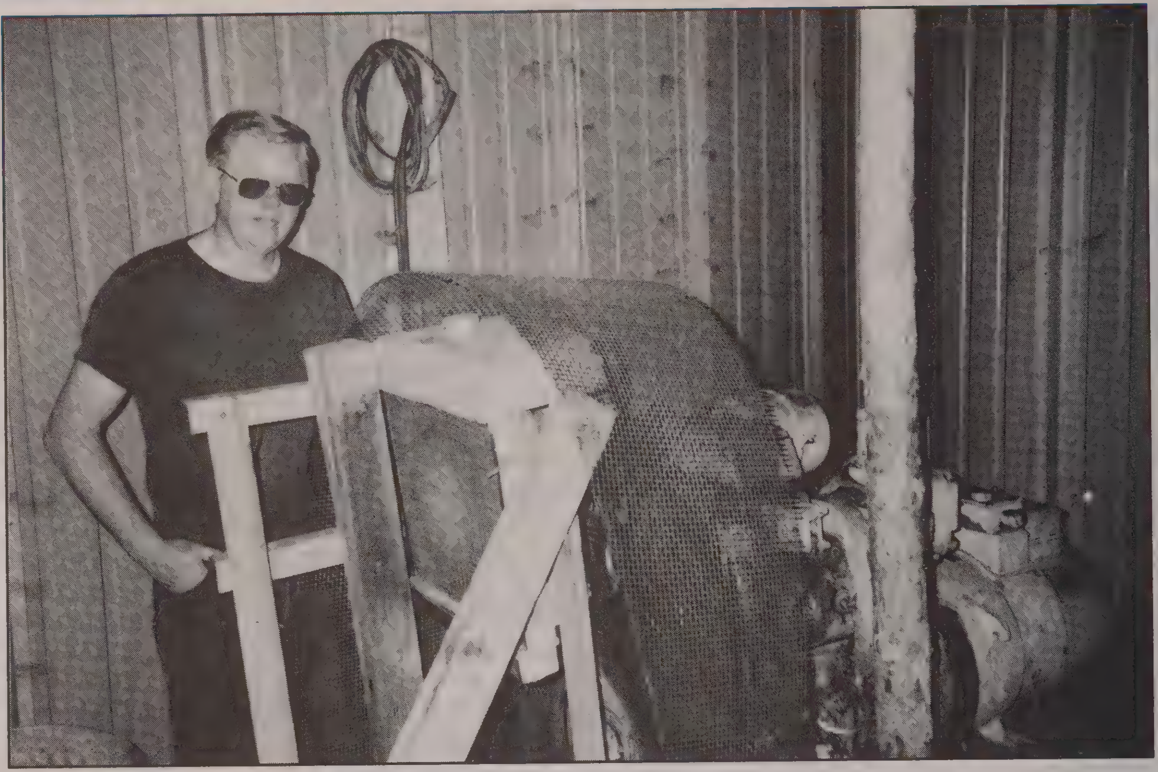
(My Summer Visit to VE7 Land. Continued from page 26)

Basic Qualification examination is composed of 100 multiple-choice questions. At least 25 of these relate to domestic and international regulations. The remainder items test theory and operating procedures.



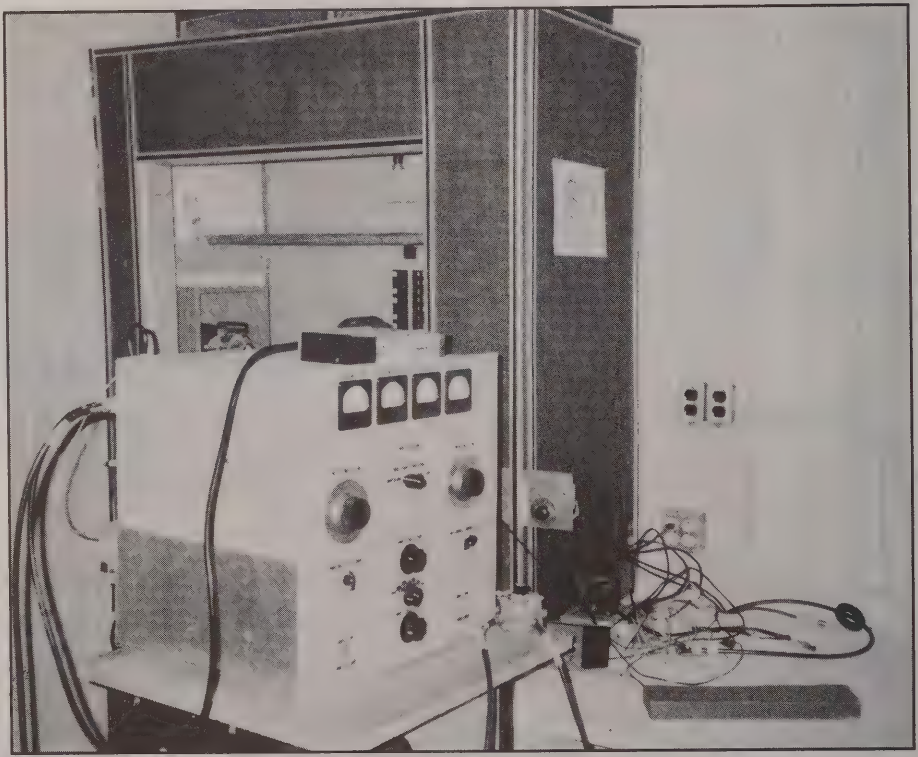
VE7AV stands by the shack's generator.

Advanced Qualification examinations consist of 50 multiple-choice questions regarding advanced radio theory.

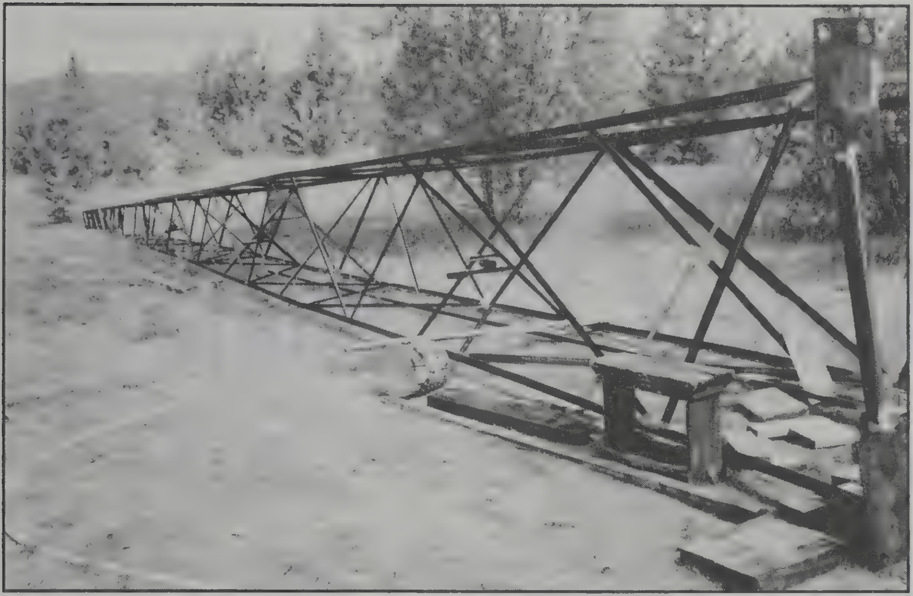
Club VE7ZZZ

After the breakfast meeting, Frank, VE7AV and Chris, VE7EQN invited me on a tour of the VE7ZZZ club. The club's large site was about a twenty minute drive east of Prince George, near Lake Link. The club house was located on an old sawmill some 17 acres in size. Today, all that remains is the bunk/cook house that has been converted into the VE7ZZZ ham shack. Behind the shack is a five-acre lake teaming with trout, so when the club members tire of DXing, they take one of the boats and go fishing.

Of the many beams the first is located next to the shack, a 20-meter wide spaced four-element feed with one inch hard line. None of the beams are rotor controlled, and are dedicated to one part of the world. Then, there is a



The 80-meter operating room.



This tower is ready to be raised.

15-meter wide spaced four-element beam, a 40-meter, and 10-meter beams. For 80-meter operation the club uses four electronically steered verticals (phased verticals). And also dipoles for 160-meter for receive and a vertical radiator over a ground plane using one of their towers for transmitting. The club is installing two more towers. When I asked Frank, VE7AV, "how do you pay for these things? Do you collect dues?" Frank's reply was, "We have bills."

On the wall of the front of the shack is the club call-sign VE7ZZZ with plenty of fire wood stacked on the porch for those cold winter nights in northern British Columbia. As you enter the front room there are couches and a table with all varieties of radio magazines to read.

Off from the front room is the kitchen. Above the microwave a sign reads, "The Friendly Club, We Never Sleep." Right around the corner is a sleeping room with bunk beds. Frank and Chris both told me that the club members do not take contesting seriously, but looking at their trophy wall I soon found out that they do indeed take all aspects of ham radio seriously.

For each band there was a dedicated room with a homebred linear with 2,250 watts PEP. In the 80-meter operating room there was a homebred linear using a 4-1000. The 20-meter room had a very large linear with another trophy wall. Then, in the repair room there was another linear under construction as a club project. The parts room in VE7ZZZ ham shack resembled an amateur radio store. Power for emergencies is provided by one 20-Kw generator and a 2,500-watt generator. There was ample diesel fuel storage to run the stations for long durations. Again I asked Frank "how do you pay for all of the neat radio equipment and antennas?" Again Frank's reply was "We just have bills!"

I had a very enjoyable time with the Prince George Club, triple ZZZ, then continued up highway 97 to Dawson Creek (the repeater at Dawson Creek that I used was 146.76 MHz) and on to Fort St. John for the 50th birthday of the Alaska Highway.

Next summer I'm taking my Kenwood TS-830S and plan to operate from the Northwest Territories.

Larry R. Luchi, W7KZE teaches Electronics Technology at Sno-Isle Skills Center located in Everett, Washington.

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DX News Around The World

By Raul Gerstel, DK3KC

3 - Tonga

A35CT will be active for the next 2 or 3 years. Listen-in on 14.219, at about 05:30.

A7 - Qatar

A71AL has been sporadically active on 20 meters CW, between 17:00 and 19:00, on 40 meters CW between 20:00 and 22:00. QSL via Box 22101, Doha, Qatar.

AP - Pakistan

Have been somewhat active in the past few weeks: AP2JT has been on 28.480, at about 14:50; AP2AL has been quite active at about 14.182, starting at 11:45. Also AP2JZB has been heard on 21.335 at 15:00, on 24.954 at 13:00 and on 28.480 at 14:00.

BV - Taiwan

Various stations have been reported on 80 meters. Listen-in on 3.503 at 14:30. Some of the stations heard were: BV7JA, BV2A and BV2DJ. QSL bureau address is: Box 93, Taipei, Taiwan, Republic of China.

C2 - Nauru

Brian, ZL1ACX is active as C21BR, through mid April. QSL via Brian Rous, Box 478, Nauru, Central Pacific.

D2 - Angola

It appears as if D2EL will be staying in Angola through September. He said he would be active in some of the islands in the region. Listen for him between 28.450 and 28.500, from 15:00 to 19:00. QSL via EA7EL. Also, Elliot, N6QHO continues to be active from the Cabinda enclave. Listen-in on 21.415, at about 19:00 and 28.485, at about 20:00. QSL via N6QHO.

D6 - Comoros

D68GA has been quite active on 28.500, at about 16:00. There has also been activity on 21.295, at 20:00 and on 24.950, between 16:30 and 18:00. QSL via N6ZV.

HK0 - San Andres

Silvano, KB6GL and Don, AA5AU have planned a DXpedition for February 27 through March 7. They will be active as HK0/... on all bands (including WARC) SSB, RTTY, and CW. QSL HK/KB6GL via KA6V and HK0/AA5AU via AA5AU.

JX - Jan Mayen

JX3EX and JX7DFA are active on all bands through April. QSL JX3EX via LA5NM and QSL JX7DFA via LA7DFA.

KC6 - Belau (W. Caroline Is.)

Oklahoma DX Association members Jim, WV5S; Charlie, W0RRY; and Coy, N5OK are returning to Belau and will use the calls KC6SS, KC6RR and KC6OK, respectively. They will be there from the 10 through the 28 of February. The DXpedition is sponsored by the Oklahoma Comm. Center and Yaesu. They will be active on all bands, (CW, SSB, RTTY). Main transmissions will take place from Koror, although there are plans for activity from other islands. QSL P.O. Box 73, Owasso, OK 74055, U.S.

OJ0 - Market Reef

Members from the OH3AC radio club in Lahti, will be at Market Reef for a week at the end of February. Weather permitting, their plans are to stay there from the 25 through the 28 of February. There will be activity on all bands (1.8 through 28 MHz, including WARC), CW, SSB, and RTTY. QSLs to OH3AC, Box 74, SF-15141, Lahti, Finland.

T5 - Somalia

TU4EC/T5 continues to be active and can be heard on the DX net on 14.226 at 20:30.

T5BLU appeared on the Afrikaaner Net, on 21.355 at

18:30. All we know about this station is "QSL via SM6APQ"

YI - Iraq

YI1MH is a new station and quite active. Listen-in on 28.507, beginning at 13:30. There has also been activity on 14.199, at about 15:15. QSL via Majid Abdul Hamid, P.O. Box 5864, Bagdad, Iraq.

ZK2 - Niue

ZK2XI and ZK2XJ are also very active. Listen-in on 3.507 and 1.831, from 11:00 to 12:00. They have also been on RTTY, on 20 and 15 meters. QSL via JA3JM.

3V - Tunisia

A station using the call 3V8AS, continues to be active. Generally it can be heard on 28.010, at 16:30 and on 24.900, at 13:20.

3D2ER can be heard on 14.195, at 07:30. QSL via W5RBO.

4K1 - Antarctica

UA3YAR is active on 14.022 and transmits from station 4K1A.

5R - Madagascar

George, 5R8AB is now QRV: 18.134 at 18:00, 28.450 at 08:00 and 21.260 at 17:00. QSL via F6FNU.
Another new call is 5R8DG (as of December 8, 1992). He has been followed on 24.952, at 14:50 and on 21.260 at 16:00. QSL via F6FNU.

9A - Croatia

9A2PM has been heard on 21.290 and also on 21.335, in a DX net, between 14:00 and 15:00. QSL manager is KA9WON.

9K - Kuwait

9K2ZZ has been active daily on 28.500, at about 13:00. 9K2MU has been active on CW. Listen-in on 24.900 at 13:00.

9M - Malaysia

9M2AX has been active on 80 meters. Listen-in on 3.799, at about 22:00.

DXCC

Croatia and Slovenia have been accepted for the DXCC, for contacts that took place as of May 26, 1991. Also Bosnia-Hercegovina, for contacts that took place as of October 15, 1991. The DXCC desk will accept QSLs sent as of January 1, 1993. Cards received prior to this date will be returned.

QSL cards from Iran are now recognized for the DXCC. This is what station W1AW commented about during news transmitted December 1. Conditions for Iran's cards recognition are that contacts must have taken place as of August 20, 1988. Cards that have been turned down may be resubmitted.

Total number of DXCC countries is 326.

Pirates

North Korea - A station using call P5DTG, has been active on 21.023 and on 28.018, between 22:00 and 02:30. The operator announced OK1DTG as its manager. This could be a pirate, but "work first and worry later". Another operator from that zone, P51AA has been heard lately and has announced HA5BBE as its QSL manager. Some Japanese operators note that this pirate is transmitting from somewhere in Japan.

Fabio, I5GJK, has received QSLs for HV3JK. Fabio indicates that he has no knowledge of a DXpedition and that he is not the QSL manager for that station.

PZ1EE, a Surinam operator, notes that PZ5EL is a pirate. No QSL!

QSL Addresses

C6AGN via KA1DIG.

C9RJJ and **C9RDM** via W8GIO (with SASE).

ET3RA via HB9CVB.

FM2GO via Lee Fontaine, Box 124, F-28113 LUCE Cedex, France.

FT4WD via F6AXX.

FO/SM0.. via SM0NZY.

FW/Y31XO and **FW/Y58IO** via Y58IO.

HP1XQN via Mark Nill, WT3K, PSC-2, Box 56, APO AA 34002, U.S.

HV4NAC via IK0FVC.

KD7P/KH4 via P.O. Box 8265, MOU3, Dededo Guam 96912-8265, U.S.

P40I via Jorma Saloranta, Karhutie 39, 00800 Helsinki, Finland.

P5RS via JA1HGY, Nao Mashita, 8-2-4 Akasaka, Minato, Tokyo 107, Japan.

S21B and S21ZG via W4FRU.

S92SS via Box 522, Sao Tome, West Africa.

T28IO and T21XO via Box 73, 1020 Berlin, Germany.

T32VU via DJ3TF.

T5BLU via SM6APQ.

T5CB via P.O. Box 1311, Buena Vista, CO 81211, U.S.

TT8OBO via WA4OBO.

V47FV via N3JCL.

V73S and V73B via Oklahoma DX Association, P.O. Box 88. Wellston, OK 74881, U.S.

VK9LD via VK4CRR.

VR6JJ and VR6BB via JF2KOZ, Yuji Miura, Room 101 Mian Haitsu, 7-3 Yanagigaoka, Tahara Atusumi-gun, Aichi 441-34, Japan.

XU6TQ via PA0EQ.

XU7VK via HA0HW.

XX9TRF via K2PF.

XX9TSW via KU9C.

ZF2RC via Howard Phillips, N6DEC, P.O. Box 5121, Anaheim, CA 92814-5121, U.S.

3W4VL via OK3IA.

4M5X via YV5ARV.

5T5CJ via W4BAA or Box 4974 Nouakchott, Mauretania.

5X5WR via MAR, P.O. Box 1223, W-8209 Schlossberg, Germany.

9F2CW via DK7PE.

WORLD NEWS

Satellite RS-15 Launching In Spring '93

A new Russian satellite for amateurs called RS-15, is to be launched in the European Spring of 93, according to Pat Gowen, G3IOR, from AMSAT. The satellite will be built by the same group that constructed the other satellites. The group is headed by V.N. Arbuzov, from Krasnoyarsk. RS-15 weighs 70 Kg., and, in its construction, is identical to its predecessors RS-10/11. The transponder on board is a Mode A, and has two telemetric beacons. An electronic mailbox with a 2 MB RAM will also be featured. The Ascendant link is found between 145.857 and 145.897. The Downlink reaches 29.357 to 29.397. Beacon frequencies are estimated to be 29.398 and 29.353 MHz. The transponder emits 5-watt power. The power of emission of the beacons is 0.4 watts with the capability of an increase to 1.2 watts. Quarter wave rods will be used as antennas. This new satellite will be placed in orbit at a height of 2.300 Km. Equator inclination will be 63 degrees.

50 MHz Band Portion Extended In Israel

Hagal International, an Israelite magazine for hams, reported in its December '92 issue that Israel has extended the maximum allowed range on the 50 MHz band. Class A licensees are now allowed to be active on the 50,000 to 50,200 MHz band. Class B and D amateurs are now authorized to transmit between 50.100 and 50.150 MHz. There's a 25-watt output limit.

China

According to the latest ARRL bulletins, it has been announced that China has allowed individual operator transmissions, as of December 22, 1992. Until now, activities were limited to radio clubs. New prefixes will be BA, BD and BG.

Slovakia

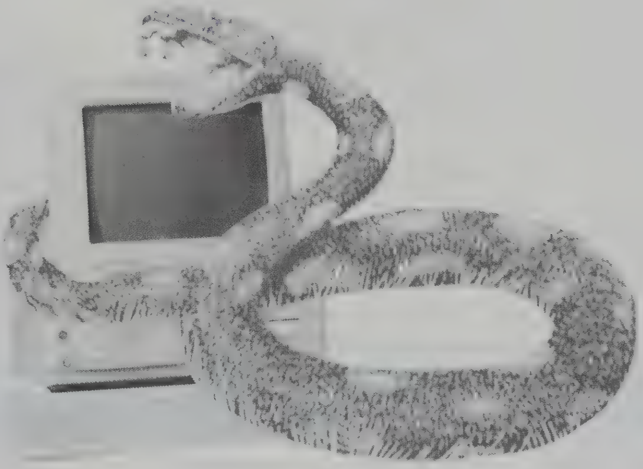
Another country division has been ratified. As of January 1, 1993, the republic of Czechoslovakia has been divided into the Czech and Slovak Republics. From that date on, radio amateurs in the Republic of Slovakia will use the prefix OM. In the Czech Republic prefixes OK and OL will continue to be used. The Czech Republic continues to use the current QSL Bureau address: Box 69, 11327, Praha 1, Czechoslovakia. A new club has been formed in Slovakia by the name of SARA (Slovak Amateur Radio Association), QSL Bureau address is P.O. Box 1, 85299 Bratislava, Slovakia.

Times are approximate ■

Virus, *Beware*

By Leo Bloom, KD4ZS

Visualize this...You are driving down the expressway in a very expensive car with not a care in the world, and then the engine quits...or you're sailing in the South Seas to some far off land and suddenly you spring a leak...or you're a ham operator in QSL with a rare station on the other side of the world and the electric cuts off. What thoughts go through your mind when something goes wrong unexpectedly?



Some of the names given to computer viruses are: Big Joke, Aids, Bad Taste, Dark Avenger, Naughty Hacker, Pray, Screaming Fist, Crazy Imp., Dot killer... and the list goes on.

There I was. Happy as a bumblebee working on my computer and trying out the program disk that my next door neighbor was bragging about. It turned out be of little interest to me, so I returned it.

At the time, computer viruses were the topic of the day and a virus called *Friday the 13* was on everyone's lips. Worried computer owners were doing everything in their power to keep it from getting into their systems. As a precaution, there were those who would eliminate the date from the system. Others would turn off their computer on that day. With all the excitement going on, I decided to try-out a virus program that I had, called F-PROT 203, developed in Iceland.

Oh, No! I couldn't believe what I was reading! *"This file is infected by the green caterpillar."* This message appeared several times on my hard drive and on two of my disks. There was no doubt. I had a virus in my computer.

I was very pleased when F-PROT 203 (designed by Fridrik Skulason) eliminated the virus in the files on the hard drive and the affected floppies. Once I checked all my floppies and made sure that all was well, I retraced my steps and proceeded to find out where I had picked up the virus.

It seems that the problem came from the disk I had borrowed from my neighbor. Determined to further explore the invasion, I asked her to give me a few of her disks for closer examination and to determine to what extent her system was also infected. She gathered and handed me all her disks and I went through every one of them and found that half of them were infected with the popular *Green Caterpillar.* I then proceeded to eliminate the virus from all her disks.

That's when I became interested in computer viruses. I learned that a virus can attach itself to your computer usually in one of two ways: Through the direct telephone hook-up of your computer to another computer, getting files from electronic bulletin boards (BBSs); or by floppy disk booting. The more you use or trade disks the greater the chance there is to get a virus in your computer system.

Some viruses will make your files smaller, deleting parts of them, and others will make the file larger. Then there are the ones which put messages in your screen, or cause the computer to lock up. Sometimes the virus will lie dormant, perhaps for a month, and then one day will start doing its damage. You'll cringe with terror as you view the letters on your computer screen start to drop and fade off out of view.

Some of these viruses originated in the U.S. However, others have been traced to places as far away as Taiwan, Pakistan, and Russia.

Upon researching the *Green Caterpillar* I found out it was discovered in early 1991 (origin Taiwan), and isolated in Ontario, Canada. This virus infects .COM, .EXE files and Command.COM. It also becomes memory resident when the first program is executed, and whenever a DOS DIR or COPY command is executed it will infect one .EXE and one .COM program on the current drive.

VIRUS HELP

The following sources were helpful in my research for this article:

Patricia M. Hoffman's computer program called VSUM, is an excellent reference for all known MS-DOS viruses. For more information on her program write to 3333 Bowers AV, Suite 130, Santa Clara, CA 95054, phone (408) 988-3773.

Check with your local library or bookstore for the excellent book, *Computer Viruses* by Ralph Roberts, published by Compute! Books Publications, Greensboro, North Carolina.

For more information on Fridrik's Skulason's FPROT-203, you may write to Frisk Software International, P.O. Box 7180, IS 127 Reykjavik, Iceland, phone (354) 1-694749, fax (354) 1-28801.

Finally, you may acquire a free guide to virus-free computing by sending a SASE (.58¢ postage) to: Computer Security Institute, 6000 Harrison ST, San Francisco, CA 94107. This guide gives a balanced approach to preventive virus medicine and is written in simple non-technical language. ■

CORRECTION

Please note error that appears on last month's issue in *Morse Code: Practical Ideas* feature. **E is (dit)** not (dah dit). Thanks for bringing it to our attention.

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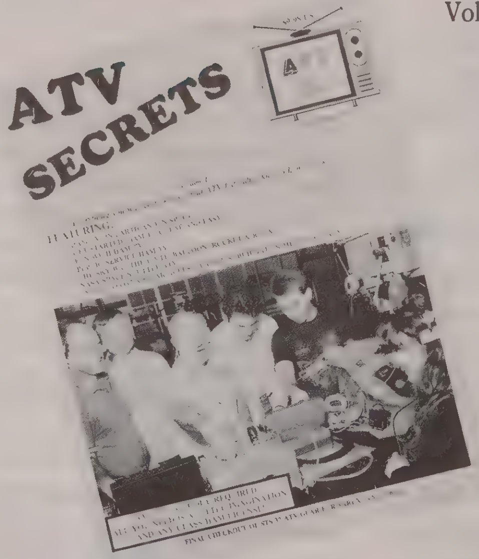

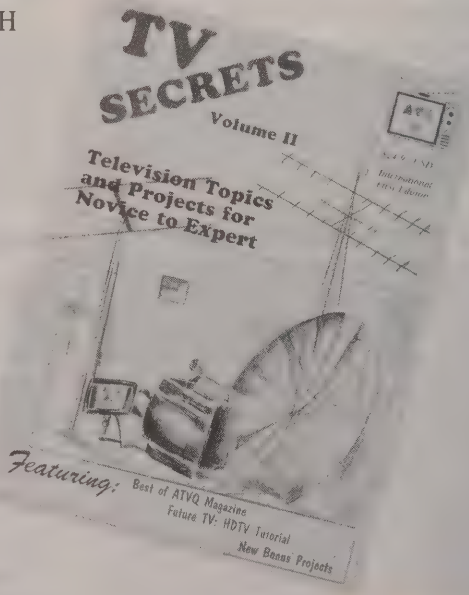

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Near Field Monitoring Test Sets

By Gordon West, WB6NOA

We are bombarded with radio signals every second of our lives. About the only way to isolate yourself from incoming radio waves would be to take a submarine ride to the bottom of the ocean (sea water is a great RF attenuator), or lock yourself up in a sealed, lead-walled room. Two-way radio technicians may work in a copper screen room, which provides ventilation but significant attenuation of incoming radio signals.

Even though we are getting our daily bombardment of radio signals just about everywhere we go, there is little health danger since these signals are so low in intensity. The time you incur a health danger from radio waves is when you are standing within a couple of feet from transmitting antenna. And as you approach microwave frequencies, the problem can get worse. But as a good radio amateur or radio hobbyist, you know to stay a safe distance away from any extra-powerful transmitting antenna system.

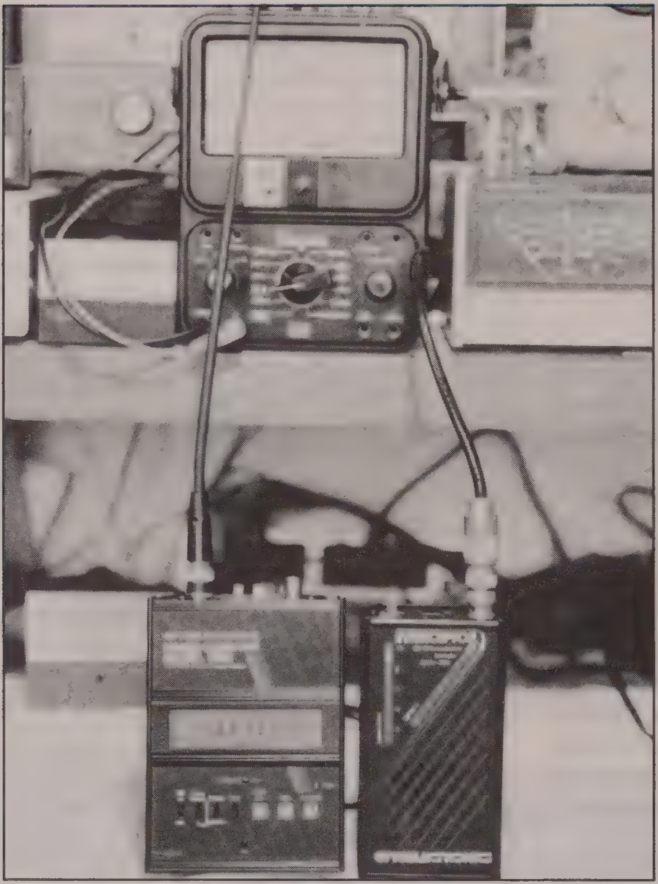
Within approximately 50 feet of most radio antennas, and 25 feet from most portable radios, exists an area called "near field" signal intensity. This is an area where radiated signal strength from one particular system is significantly stronger than the typical radio frequency signal levels of other transmitters further away. This area from a few feet to as much as 100 feet away from a transmitting radio set-up is strong enough to let your portable frequency counter lock on and read out the frequency that this set is transmitting on. If you have a communications test set, such as an IFR or Motorola test set, it will quickly display the wave form of this near field transmission for you to take a close look at frequency stability, on frequency, modulation deviation, CTCSS levels, and any other noise that might be riding along with the transmitted output.

The portable frequency counter is a powerful tool for near field signal analysis. When the counter locks into a transmitted signal, it will display the frequency of that signal, and also confirm the typical near field signal strength from the portable, mobile, or base station set.

The NearField signal test set from Optoelectronics. Photo: WB6NOA.

The other day I was testing a small handheld portable out in the field with a frequency counter. The portable was right on frequency on transmit, but the near field signal strength was so low that the counter had to be held within 5 inches of the antenna. Something was wrong. You guessed it—typical with most handheld 2-meter and dual-band transceivers—the extra long rubber-duck antenna loosened up the BNC antenna post, and the hard-wire connection to the circuit board ultimately pulled off the circuit-board solder trace. If you don't have a wattmeter in the field, a frequency counter is another tool to test for reasonable output field strength.

The adaptation of the frequency counter has created some new products for Optoelectronics (5821 NE 14 AV, FT Lauderdale, FL 33334; (305) 771-2050). Their R-10 FM NearField Interceptor™ portable test set is a cross between an extra-sensitive frequency



Near field test sets on the bench. Optoelectronics 3000 counter and the new R-10 interceptor. Photo: WB6NOA.

counter and the world's fastest frequency scanner. Place this instrument and its little tiny telescopic whip anywhere within near field signal strength of a transmitter or its associated antenna system, and within two seconds you clearly hear the full fidelity audio coming from that transmitter, plus you *see* the deviation level of the modulation or AFSK signal, plus you can confirm its signal strength from the LED strength meter. A squelch control allows you to adjust for near field sensitivity, and the volume lets you easily hear the recovered signal, or you can plug in an earphone for a counter feature to sniff-out bugs or hidden tees.

Any FM Signal from 30 MHz to over 2,000 MHz can be intercepted without gaps in coverage. The R-10 worked best in the near field signal strength surrounding a transmitter where the signal strength is high, but falling off rapidly with increasing distance. The corresponding far field is where signal strength is relatively low, but falling off slowly with increasing distance.

With the small supplied telescopic antenna pushed all the way in, our range to portable ham radio HTs was about 20 to 40 feet. Pulling the antenna all the way out increased our range to well over 100 feet to a small 5-watt transceiver.

Specifications

Frequency Range	30-2000 MHz
Modulation	FM, Deviation < 100 kHz
Frequency Response	50 - 3000 Hz
Auto Tune Time	< 2 seconds
Input	50 Ohm, -45 dBm @ 100 MHz, -20 dBm @ 1 GHz
Outputs	Internal Speaker, Audio out jack
Controls	Audio Level/Power, Squelch Deviation 10k/100k, Skip
Indicators	LEDs: Lock, Power 10 Segment LED Bargraphs: Deviation (FM, FMn), Relative Signal Level
Power	Internal NiCad Pack, 7.2V 600 MA Hr. 6 hours operation
Enclosure	Extruded aluminum enclosure with black painted exterior.
Size	5.1" L x 2.8" W x 1.5" D

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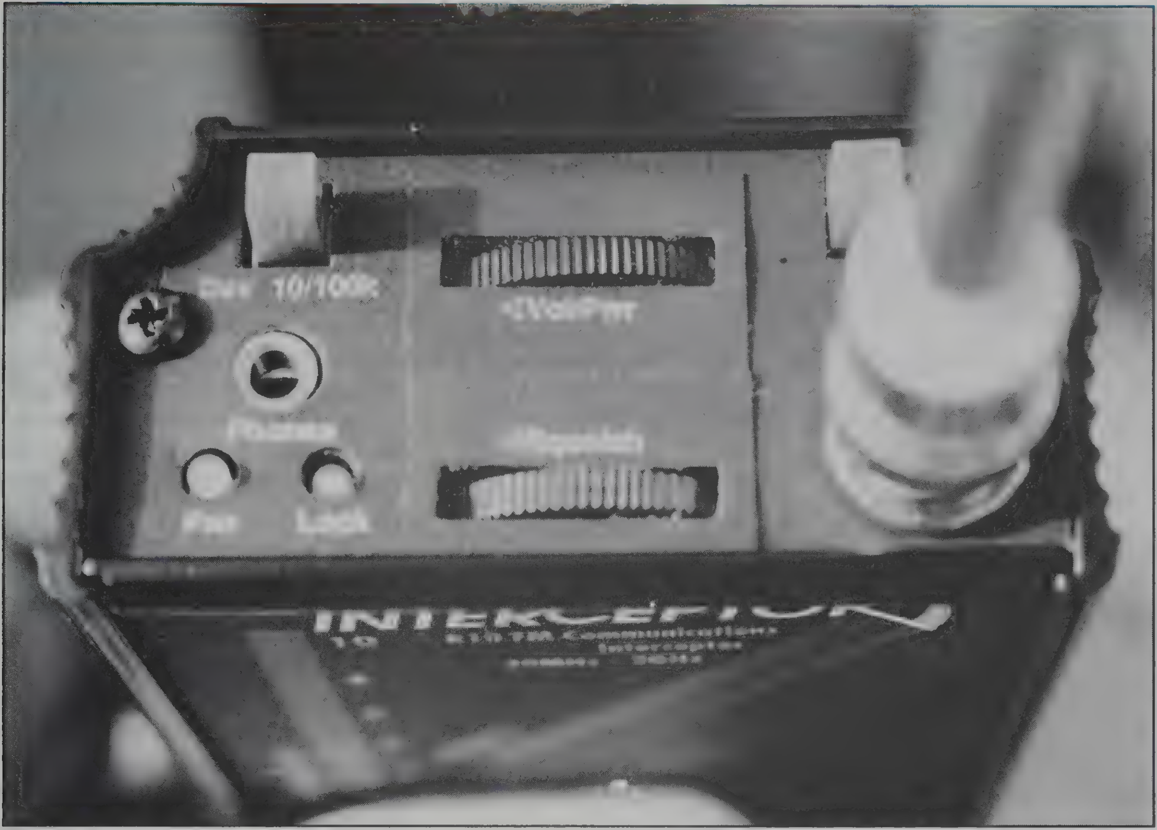


The "lock" LED (left) illuminates when the interceptor R-10 grabs an active near field transmission. Photo: WB6NOA.

The volume and squelch controls work just like a scanner radio. Photo: WB6NOA.

The deviation button allows for 10 kHz or 100 kHz readouts. Photo: WB6NOA.

When hooked up to an outside antenna, the unit locks onto just about anything and everything out there if you turn the squelch control to minimum. You can then push the "skip" button to march through the incoming signals and hear all there is between 30 MHz to 2,000 MHz! But this unit is most useful in close with a small telescopic whip for near field snooping.

My unit kept locking up on a signal and I just couldn't figure out where it was coming from inside my house. I confirmed it with a frequency counter that read out the signal around 900 MHz. Now what in the world did I have at 900 MHz constantly running? Was it a bug? Was someone trying to tune into Gordon West Radio School?

I followed the escalating signal strength, while decreasing the length of the telescopic whip, and found myself on the back of my television. There it was—my TV "rabbit" still turned on but switched out of the TV circuit because the ball game was over. As soon as I turned off the video sender, the dead carrier dropped.

We found the deviation level LED indicator quite helpful to spot handhelds and mobile units whose modulation level was set too hot. There was enough damping in this circuit to fine-tune the deviation levels down to about 4 kHz.

I took this unit mobile, and every time I drove anywhere near another car using any type of 2-way radio equipment, I could pick up their conversation clearly. Driving down a residential area, 49 MHz intercoms and baby monitors came through loud and clear. For increased range, I would simply pull out the telescopic whip, or attach to an outside antenna, and then skip through all the received conversations to find out which one was most interesting to monitor.

Several interesting options are available for this unit—such as the DTMF tone decoder, the CTCSS tone decoder, or an amplified pre-selector to enhance the reception on a specific frequency. The Optoelectronics R-10 Interceptor ran for about 6 hours on an overnight charge of the built-in nickel cadmium batteries. It takes about 8 hours to recharge them back up to full with the supplied wall charger.

After playing with the unit for several weeks, it has now become a permanent addition to my radio test bench. About the only thing I see—or I should say "I hear"—that may need improvement is a little bit more AGC action on the recovered audio output. It's not a problem when listening with the normal speaker, but with an earphone, the snap, crackle, and pops of bits and pieces of a conversation can really get your attention quick!

I found I was using my portable frequency counter right along with the R-10 in order to document the actual frequency of a near field transmission. As long as I was in close to the transmitter, the counter would quickly lock into the audio being received by the Opto R-10. But the R-10 can be made so sensitive by reducing the squelch and increasing the antenna length, it will pick up anything and everything whereas the frequency counter only works in close. Maybe we'll see Opto build the frequency counter into a bigger box that might also contain the R-10. It would be a lot more expensive, but now you have one nice, neat, big package for sniffing out anything and everything, listening to it with the R-10, and seeing its frequency with your frequency counter.

To receive more information about this new exciting product, write to Optoelectronics for more details. I see a lot of ham radio accessories that travel passed my test bench, but few except for this R-10 stay here as a permanent piece of test equipment in our ham radio classroom and training facility.

Opto also has an AM version that tunes in shortwave—but for me, the action is all between 30 MHz and up—easy hunting for the Optoelectronics R-10 Near Field test set. ■

Hams Work Overtime During Various Emergencies

By Ann Shaver, AH6KY

Amateur radio operators pride themselves on being able to provide emergency communications during disasters and emergencies, and 1992 provided ample justification for this pride. War, hurricanes, tornadoes, adrift at sea—in these situations and more, hams demonstrated the value of the amateur radio service. In Bosnia-Hercegovina hams have provided vital information on their dire straits to both relief workers and the concerned world. In Hawaii, hams with direction-finding equipment triangulated and helped locate a couple adrift for several days in a powerless motor boat. And in both Florida and Hawaii, hams provided invaluable information and communications in weather-related events.

Fortunately, few of us will ever be in a war zone. And the chances of participating in a missing-person action are relatively slim. The odds of being involved in catastrophic weather or a local calamity, on the other hand, are fairly high. Knowing how hams operated—the not-so-good as well as the near-heroic—can help us hone our own skills and be ready when an emergency strikes.

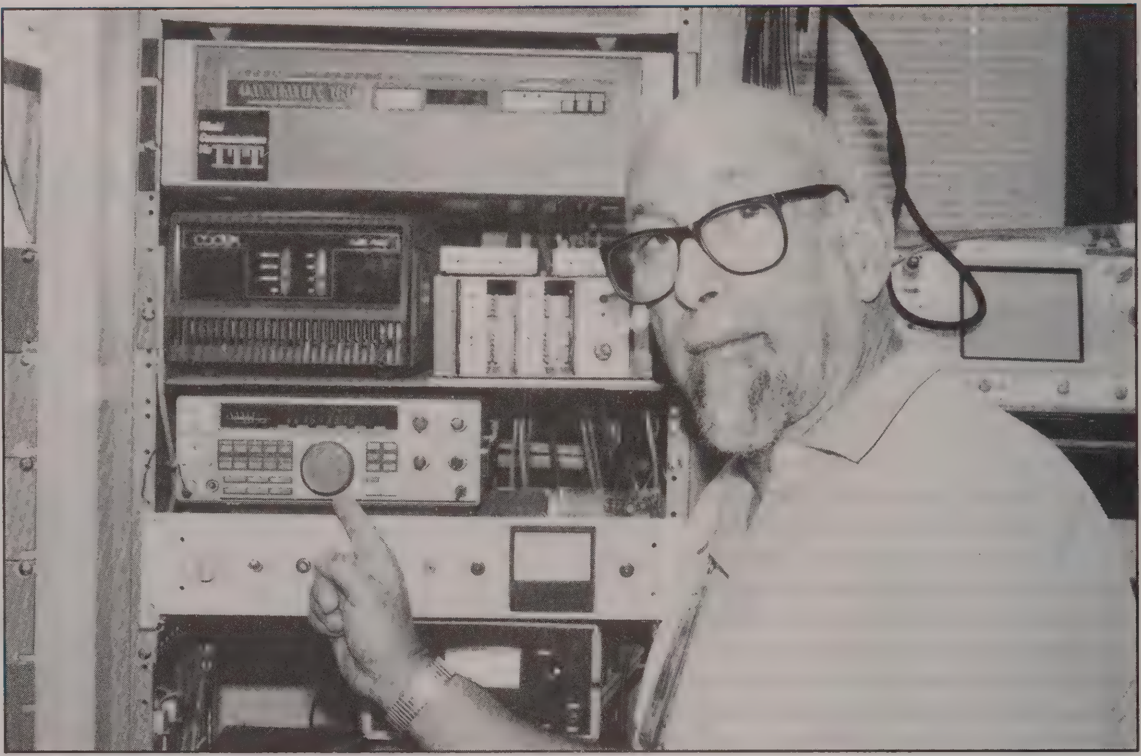
Pinellas Tornadoes

"I slept late that Saturday morning," reminisced Steve Sanders, N4WAK. "Just for fun, I turned on the radio before I took my shower. My first thought when I heard them giving damage reports was that I had forgotten about our RACES simulation. I quickly realized No! this was a real situation they were working. I broke in and offered to take the net for Charlie, N4OBT, our Pinellas County (Florida) Emergency Coordinator (EC)... After all, when you hit that PTT, you have to be ready to jump in with both feet!"

Nani Rhoden, AH6II, was one of the scores of Hawaiian hams who copied health-and-welfare traffic sent by Joe Keola, KH6BFZ. Photo: AH6IH.

Indeed, amateurs rendered an incredible service the morning of October 3 1992 as numerous tornadoes raced through Pinellas and surrounding counties. A freak convergence of three weather systems spawned multiple tornadoes. Incredibly, the National Weather Service's nearby transmitter failed just when it was most needed. Not only was no advance warning possible, the Weather Service was unable to give bulletins or other information during the devastating wind storm. Skywarn volunteers and the Clearwater Amateur Radio Society emergency net provided vital and timely information.

In addition to real-time tracking of the tornado progress, amateurs reported to area hospital emergency rooms and other facilities to provide communications when needed. When the ambulance dispatch center did lose its communications for about 45 minutes, service was not disrupted—amateurs were already there, ready to fill the need.



Mike Morrow, KH6JQM, knows the value of Skywarn from the dual perspective of a professional meteorologist who is also an active ham. Photo: N6VQE.

Hurricane Andrew

Volunteers from the entire Southeastern region rushed to Dade County following Hurricane Andrew to use their communication skills to lessen the suffering. Hams assisted at field hospitals and food-distribution sites and accompanied the National Guard into the wreckage of communities, looking for isolated victims. For days, the only effective, reliable communication within the stricken area was via amateur radio.

One group, an ARES response team headed by Ozzie Osband, N4SCY, travelled from the Tampa Bay area. "This was basically an ad-hoc, grassroots effort, coordinated with ARRL. George Foster, NY1H, heard a general call on HF for replacement workers. The first response groups were already fatigued, and several clubs and individuals in our area offered to relieve them," explained Shipman, the Pinellas EC.

In addition to radio gear—rigs, batteries, antennas, coax, fittings, and the like—the Tampa Bay group brought food and medical supplies with them as well. Aware of the disruption to Dade County's infra-structure, the group also took a barrel of gasoline and a case of oil.

When they arrived they found organizational chaos in addition to physical disruption. Local authorities—themselves often over-stressed volunteers unfamiliar with Dade County—did not have specific assignments for the Tampa Bay reinforcements. The response team divided into 2-person units and found a variety of places to be useful. With street signs blown down, even finding specific locations was not simple or straightforward. No one claimed disasters were easy!

"We were basically unsupported at the food-distribution site where we ended up," said Scott Houldsworth, KC4TGQ. "Shortly after we arrived, the other volunteers left. Keith Goff, KC4DIP, and I became the site managers. I'll tell you, it was scary being alone there that first night. Real quickly, we got smart. We provided food, cookies and juice for the National Guardsmen in the area and we tuned a radio to a popular local station. That way, we knew they'd always be around. I did a lot of things that were not strictly communications just because they needed to be done. I know we're supposed to be communicators, but if you're there to help and make things work, you'll do other things, too."

Carolyn Davis, KC4SXP, confirmed the lack of coordination that volunteers faced in Dade County. "People wanted to help, but things were very poorly organized. We had useless medical supplies at the field hospital where Bob (her husband, N4ZML) and I were. We had sophisticated surgical supplies—what we really needed were basic first-aid materials. We went 20 hours a day monitoring radios, passing traffic, coordinating activities and supplies, and so forth. The EOC wanted medical reports, but we were too busy trying to care for patients."

After the immediate crisis was somewhat resolved, Houldsworth, Davis and others accompanied nurses and National Guardspeople into devastated neighborhoods looking for additional victims. "The National Guard wasn't crazy about having us come along with them at first," Houldsworth explained. "They didn't understand our function. They changed their attitude rather quickly when they realized they could communicate with each other but not with the field hospital!"

The Tampa Bay response team included (left to right) Carolyn Davis, KC4SXP; Bob Davis, N4ZML; Keith Goff, KC4DIP; Scott Houldsworth, KC4TGQ. Second row, Ozzie Osband, N4SCY; Bill Reiss, KK4XI; Ed, KD4OOS; and Chris Novack, KN4VU. Photo: KC4TGQ.

Hurricane Iniki

Less than a month after Andrew ripped through southern Florida and Louisiana, Hurricane Iniki was a most unwelcome visitor to the Garden Isle of Kauai. Also a Category 4 storm, Iniki left this northern-most of the Hawaiian Islands virtually isolated. The furious winds destroyed all commercial power and communication lines, wiped out commercial broadcast stations, and rendered government backup communications systems useless. Although the details were not known, officials in the state capital and major city, Honolulu, knew something dreadful had happened. That's when Joe Keola, KH6BFZ, sprang to action.

"You don't know it yet," he thought, "but you need my help!" Within four hours of the all-clear signal, Keola had convinced state officials to send him over as part of the State Civil Defense response.

Totally self-contained, Keola brought food and water with him as well as transceivers, power supplies, dipoles and quads for various bands and other necessities. Instinctively recognizing the ironic possibility of helpers becoming burdens, Keola was careful not to tap local resources in any way.

It is hard to imagine just how isolated an island becomes when it suffers a major catastrophe, such as Hurricane Iniki. With no commercial power or communications lines available, with roads blocked by tons of debris, it is almost impossible to begin restoring life to normal. Indeed, with both cellular and regular telephone service to and from Kauai completely severed, the Mayor of the island communicated with the governor of the state via an amateur 2-meter repeater located on Oahu. By definition, disasters are chaotic; island environments make them even more difficult to alleviate.

"I went out of my way to try to help the Red Cross," Keola explained, "but they were not appreciative. They said I couldn't help them. So I went off and within 20 minutes Charlie Otnott, WD5BJT, and I were operational in the field. The first two nights I slept on the sidewalk."

Keola didn't do much sleeping, however. The first day he sent 1,000 health-and-welfare messages in six hours.

"At first I used 7.288 MHz, but it was so crowded. People were just ragchewing while we had a real emergency to work. So we moved to 7,088, that portion reserved for operators in Hawaii, Guam and the rest of the Pacific area. People kept away from us there, and we could really work. "I'd pass 20 or 30 messages to an operator—until he cried 'uncle'—and then I'd move on to the next operator. We must have kept at this for six or seven hours at a time."

Nani Rhoden, AH6II, Bill Rhoden, AH6IH, and Chuck Burch, AH6IN, all on Oahu, copied hundreds of messages from Keola and then contacted the individuals mentioned in the traffic. Bill Heyde, KH6UU, Ken Arck, AH6LE, and other members of the Maui Amateur Radio Club also received Kauai traffic from Keola.

"I'll tell you, it got really emotional at times. I'd work the traffic from Joe, and then my wife, Machiko, and I would make collect phone calls all over the country. We handled 151 messages. Only two people refused the collect calls and there were only two 'wrong' numbers. When I checked back with Joe, he verified that the number I had was the number he was given. The phone company operators were really nice, too. After a while, we would get the same ones over and over. They understood what we were doing. If we reached an answering machine, the operator let us leave a brief message without any charge."

Scott Houldsworth, KC4TGQ, shows Al Shaver, AH6KX, how he operated his 2-meter HT off an ordinary car battery.

It is hard to imagine just how isolated an island becomes when it suffers a major catastrophe, such as Hurricane Iniki... With no commercial power or communications lines available, with roads blocked by tons of debris...

Anticipating Emergencies

Each of these three disasters holds important lessons for the inevitable next time. The almost textbook-perfect response of volunteer communicators to the chain of tornadoes was possible largely because of the training and practice the participants had had. In both of the hurricane situations, on the other hand, volunteers were not familiar with each other, their surroundings or often even their missions.

"Our weekly emergency nets really paid off," reflected Sanders, who assumed control of the net of weather-spotters during the Pinellas twisters. "Our Club frequently schedules speakers from the National Weather Service. From them, we have learned the important things to look for as severe weather develops. Because of the weekly net and our occasional simulations, a core group has emerged, able to respond quickly and appropriately. I don't mean to sound cocky, but this time things went right."

"Skywarn is an excellent program," advocated Mike Morrow, KH6JQM, a professional meteorologist at Oahu's Weather Service office. "It works two ways—we educate hams about weather phenomena and they notify us when they observe what we've talked about. It really works!"

Hams don't always have the luxury of being able to work an emergency in familiar settings, with operators whose styles and strengths are known to each other. More often, the presenting situation is one of extreme chaos and disruption. It is easy to say we should learn from these experiences and be ready to respond appropriately the next time. The truth is, however, that each disaster is unique, presenting its own challenges. The most important lessons to learn, perhaps, are the value of preparedness and the value of flexibility. When disaster strikes, amateurs—and their equipment—must be ready to respond to any scene that presents itself. ■

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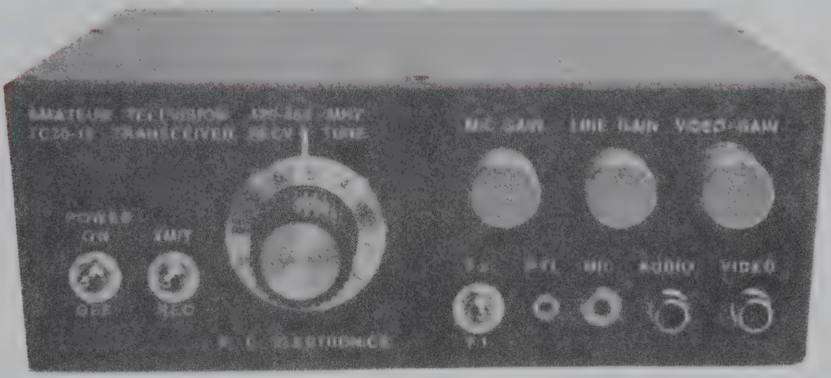

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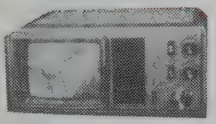

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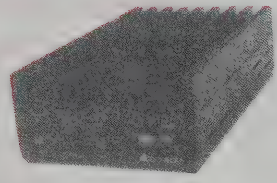

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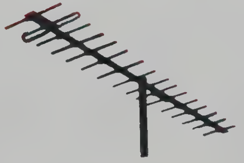

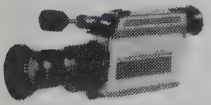

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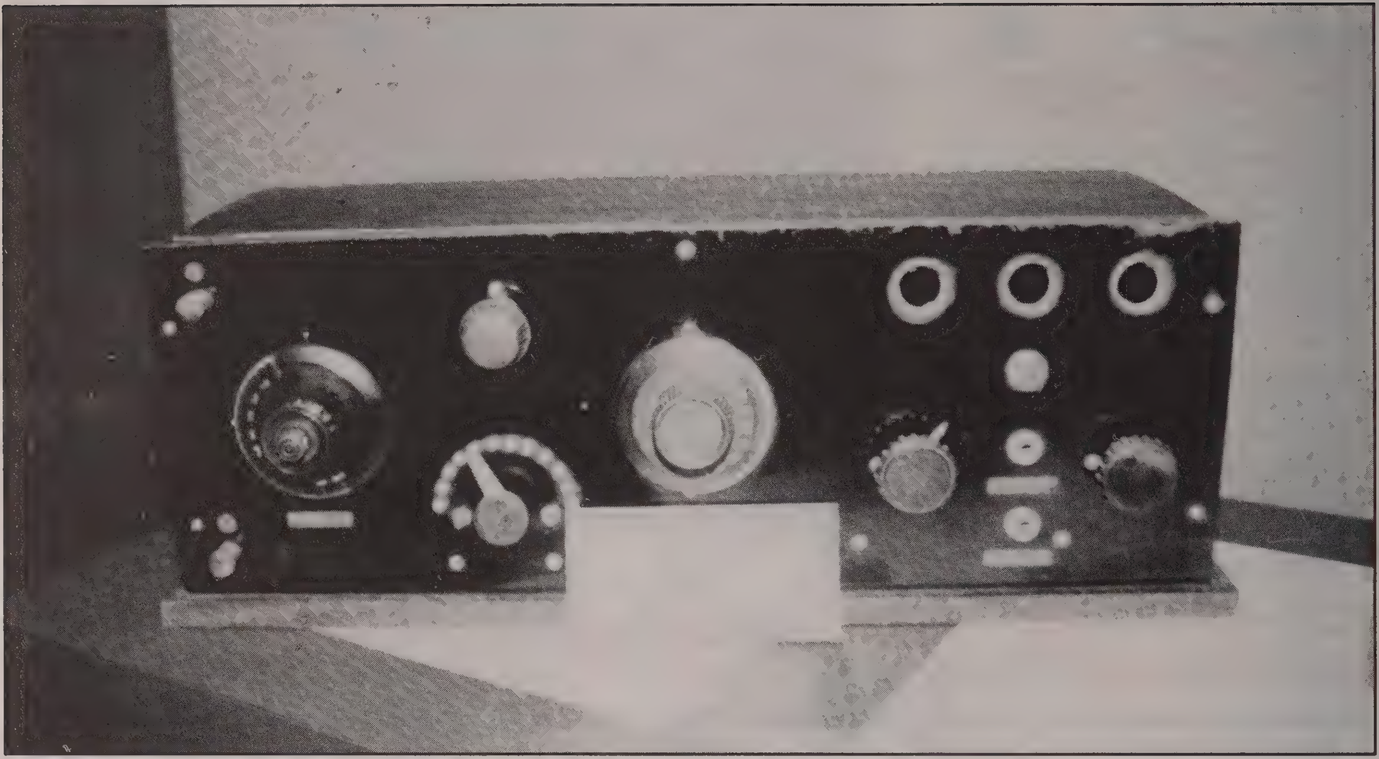


Commercial radio built by Agusty in 1922.

Puerto Rico's First Radio Amateurs

(Continued from page 10)

turns in the primary and 600 in the secondary with No.36 wire. I built my first tube receiver with two cheap variable condensers and two tubes. It was regenerative and worked very well, although it was ghostly. Once the station was tuned, I could not move or breath too heavily because the station would disappear. I solved this problem by grounding the receiver and covering it with a layer of copper.

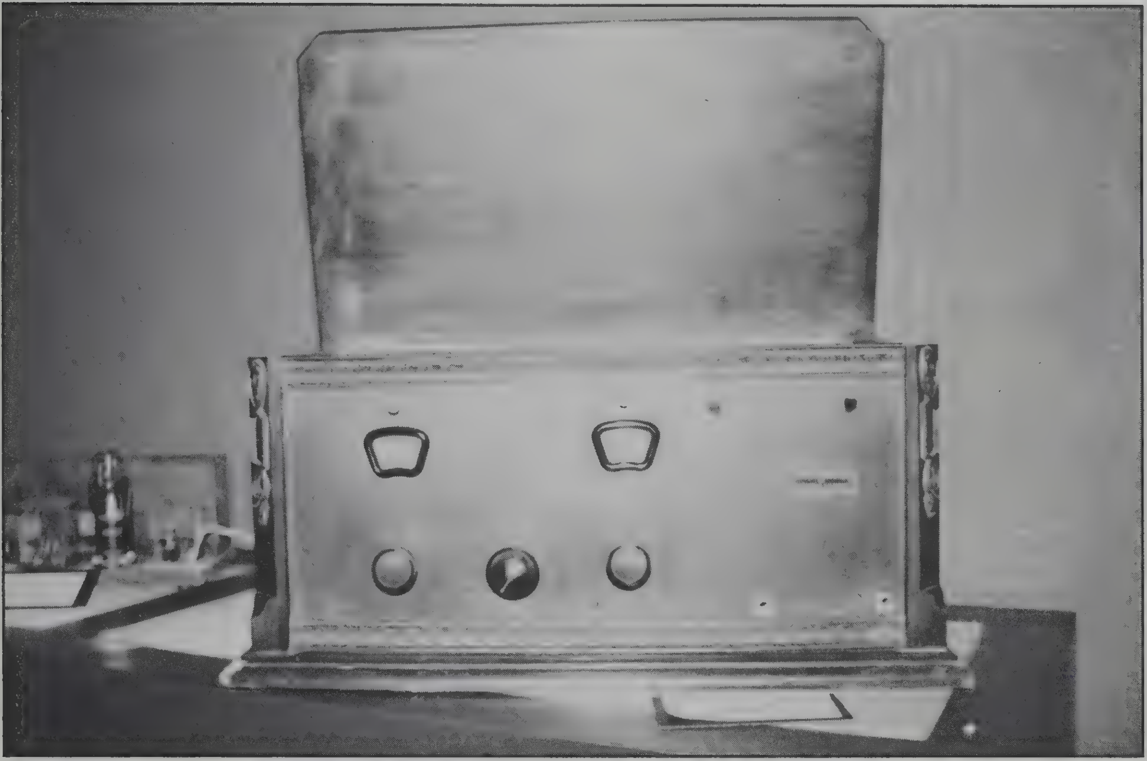
Since the spark transmitter had become obsolete, I procured a new tube transmitter. It looked like an undressed doll. It was supposed to carry 50 watts. I made a power pack with mercury tubes given to me by a seaman in Caneyu as we shared a bottle of rum! After hundreds of tests and changes I was able to establish contact with amateurs on the East coast of the United States.

My antenna had to be taken down during World War I, as ordered by the Federal government. As soon as armistice was confirmed on November 11, 1918, I reinstalled it and eagerly pursued electricity and radio studies and experimentations with even greater enthusiasm than before.
I obtained any and all books and catalogues published on the subject at the time.

By that time, I.T & T, the owner of the telephone company, had plans to install a broadcast station in Puerto Rico. The engineer and the installation team had already arrived and the Radio Corporation of Puerto Rico had been established. They offered me a position as administrator, and after repeated offers and encouragement from friends at the Club, I resigned as the Club's president. In August 1922 I joined the Radio Corporation of Puerto Rico and its station WKAQ, which I inaugurated December 3, 1922.

I moved to Pershing Ave., in Santurce, built my new laboratory, repair and construction shop, and set up the room where I installed a new transmitter and receiver. I made a radio transmitter that I copied from one Ochoa lent me. It was a *Paragon* and was very efficient--for local purposes.

I already had a used receiver, one of the first built by National. The antennas



This is a long-wave radio built by Joaquín Agusty in 1922.

were made up of six different wires, going in all directions, that merged at a switch in order to select the one that allowed for a better signal.

By this time, and despite my work at WKAQ, my personal communications were taking place regularly with foreign amateurs and proof of contact cards were arriving, by the dozen, from the U.S. Some cards came from other countries that allowed radio amateurs to operate which, back then, were few.

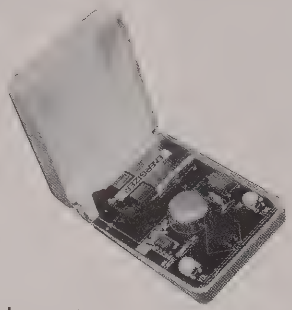
Piñero, Luis Rexach, Saldaña, Mario Castro, Pedro Rodríguez, Richard Bartholomew in Garrochales, Carrero in Mayaguez, and many others were quite active. I was able to fill the walls and ceiling of my shack with cards, despite the darned static and QRM caused by the many amateurs now on the air in the U.S.

Luis Rexach, 40I's daughter Nelly, a child, was ill in New York. Every afternoon, Luis made contact with an amateur in that city and knew the status of his child from his station in Martin Peña. Today, Nelly is married to the congenial president of the *Banco Popular Papi Carrión*.

All my life, I've "lived" with hobbies. I collect copper and silver coins, tools, books and papers, antique weapons and furniture, fossils, ceramics, plants, animals, stamps, and I don't know what else. But, none of these things compare to having been the first amateur radio operator, having enjoyed pleasures, and even sorrows, that I will never forget.

Among others, I had an experience one rainy afternoon. I tuned to a station in Sao Paolo, Brazil, calling CQ. I called and the operator responded. I told him that I had a message for that city and he took it. He told me to wait a while and then returned with a response. The addressee lived downstairs from the amateur. The message was from my friend Alberto Lee, to his brother who lived in Sao Paolo. I quickly left in my old *Essex* to deliver the message. Mr. Lee couldn't believe what had happened and even wanted to pay me for my services. I explained that charging for these services wasn't allowed, that it was all free and performed for the love of the hobby.

Another fine amateur was Ulises Marín



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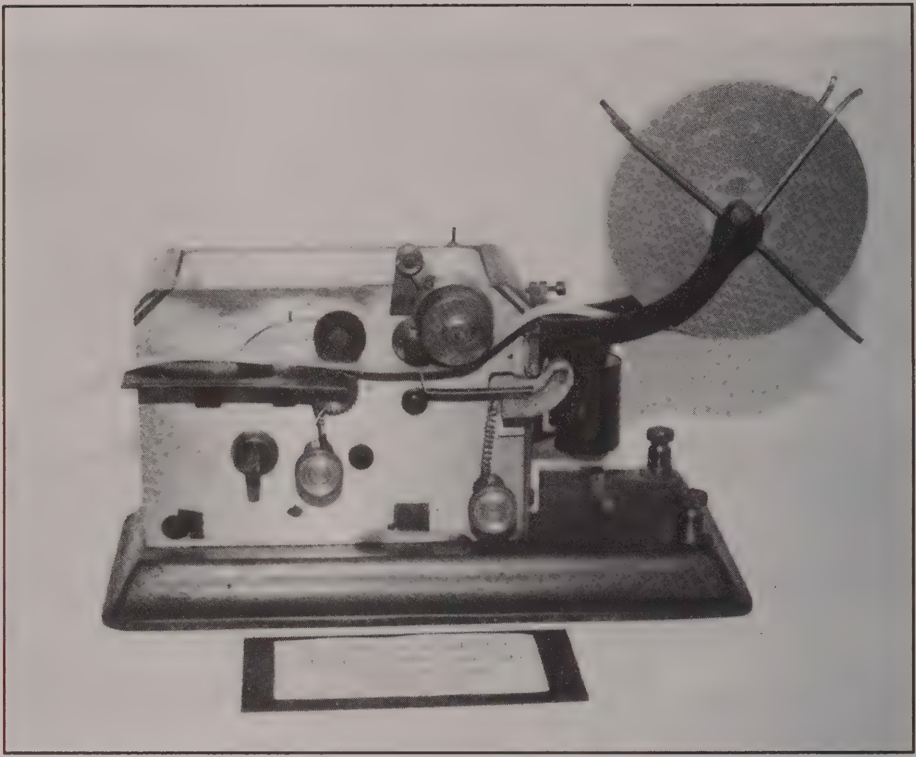


Telegraph receiver used to copy signals in Code, built by PR4JE.

who was active then and is active today. Isidoro Baldrich, in Cayey, was another excellent old timer, as were many others whose names escape me. So many nights spent trying to communicate with amateurs in the Pacific...The anecdotes and events surrounding amateurs from 1920 to 1930, would fill a book.

You, today's operators, have succeeded in reaching the kind of electronic progress never dreamed of. It is important to mention the problems that we had back then. We had to build our own sets, without blueprints, without technique and without means within our reach.

The progress that the Radio Club of P.R. enjoys today is primarily the result of the efforts by the Parents of the Puerto Rico Amateur Club: Felix, and Alicia Rodríguez. Alicia, a modest, friendly and charming woman, is truly the Mother of Puerto Rican radio amateurs.

All my life, I've "lived" with hobbies. I collect copper and silver coins, tools, books and papers, antique weapons and furniture, fossils, ceramics, plants, animals, stamps, and I don't know what else. But, none of these things compare to having been the first amateur radio operator, having enjoyed pleasures, and even sorrows, that I will never forget.

Editor's Note: *Agusty's original article appeared in Spanish in 1969 in Onda Terrestre, Radio Club of Puerto Rico's official publication. These were his first and last written words on the subject of his radio days. PR4JE died in 1973 at the age of 78. Our thanks to P.R. correspondent Carlos F. Gutiérrez, KP4AA and the Radio Museum of Puerto Rico for providing us with original article and photos. For a pictorial report on Puerto Rico's Radio Museum, where many of these original sets are in exhibit, see Radioscan's (now Amateur Communications) September 1992 issue.* ■

Translated by Lourdes Simón.

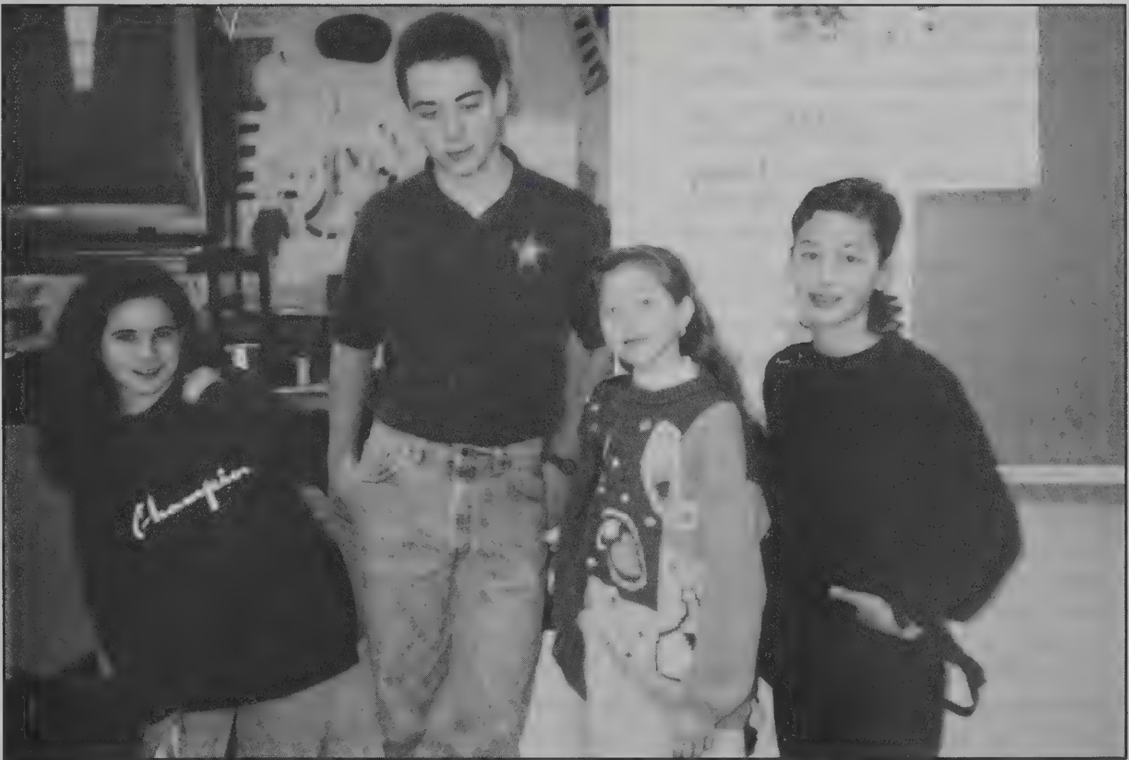
Young Speakers

By Carole Perry, WB2MGP

Several months ago I had the privilege of co-moderating the Youth Forum for the ARRL Hudson Division with 16 year old Mark Hartmann, N2MCV. Mark proves the point that children react especially well to ideas and suggestions presented by their peers. Rich Moseson, NW2L, who is the North New Jersey section manager for the ARRL appointed Mark to be a section manager in charge of youth activities. Rich says that, "Mark is the only teenager and one of only two people under 30 in a management position with the ARRL."

At the Youth Forum, we had an audience made up primarily of teachers and recruiters of young people, looking for some creative approaches in working with kids. I'm always suggesting that clubs or youth groups look for enthusiastic young hams to do a lot of their recruiting for them. Having a lively presentation by a youngster is a sure fire way to excite the children in your audience.

Well, I took some of my own advice and recently invited Mark to come to my school to address some of my ham radio classes. My 6th, 7th, and 8th graders at Intermediate School 72 in Staten Island, New York, are used to having all kinds of interesting ham radio operators visit them. After eleven years of teaching, "Introduction To Amateur Radio" to the age group of 10 to 13, I have learned a couple of "survival" techniques. One of them is to provide an environment that is conducive to having fun while learning. Highly motivated children will surpass your highest expectations of them.

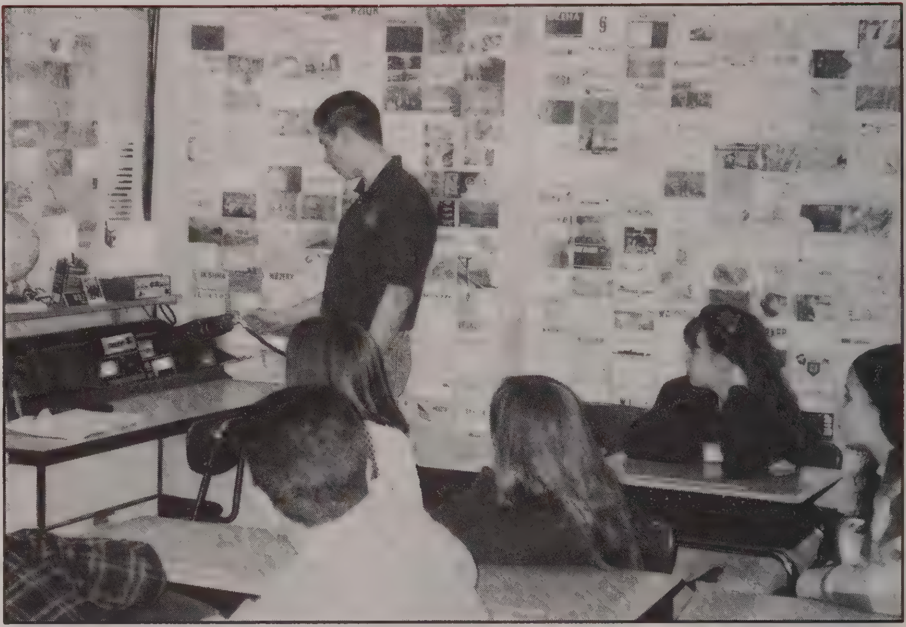

Mark, N2MCV, (ARRL North Jersey Section Manager in charge of Youth Activities) chatted with 6th graders. Left to tight, Val, Nicole and Ed.

In the week prior to Mark's arrival, I prepared the students for his visit by telling them about his background and having them prepare a list of questions for him. Of course, this became a good opportunity to discuss interviews and how to phrase questions in an intelligent manner. The beauty of amateur radio in a classroom is that it allows the teacher to cross over into all areas of the school's curricula. Language Arts skills, which are a big part of communicating, are abundant in a ham radio class. The kids were looking forward to meeting someone close to their own age.

Mark told my classes that he first became interested in ham radio two years ago because he enjoyed scanning the police monitor and listening-in on the other bands. It didn't take him long to realize that he would have more fun if he were able to transmit.

Two local hams taught Mark the basics and he was on his way. Today he is a Technician who is looking to upgrade. The children were especially interested as he described Sparta, the town in New Jersey where he lives. He made them laugh as he told them how isolated and remote this area is. Mark said that counting cows can become the evening's activity when the teenagers don't have much else to do. I think he capably described how valuable the radio can be for communications in a situation such as his.

Mark is a junior at Sparta High School where he is trying to start a ham radio club. He enjoys packet radio and communications on the VHF and UHF bands. He volunteered to work on the local ambulance during the weekends to help out on the radio. Mark even had an exciting story to tell about how his knowledge of radio helped him to make a contact with a local Secret Service Office that needed some help with a coaxial cable hook-up that he was able to provide for them. In return, he was presented with a T-shirt and jacket from the Secret Service with his own name on it. I could tell that the children were very impressed as Mark proudly held the jacket up to show them.



N2MCV, tried to access the Sparta repeater in New Jersey, from our classroom in Staten Island.

My classes enjoyed hearing our young guest speaker describe the use of repeaters in his area. There was more than one giggle as Mark recounted some funny experiences of speaking to his girlfriend on the local repeater through an autopatch. He encouraged the youngsters to get their ham radio licenses so that there could be more young people on the air for him to speak with.

By the end of the fourth presentation to the fourth class, Mark had a greater respect for teachers who must keep their own energy and enthusiasm level up for the classes at the end of the day, even after having done the same presentation seven other times that day.

All the kids left my room smiling; and there was a good follow-up response the next day. The children appreciate any speaker who is lively and gets their attention; but they do seem to especially enjoy listening to their own peers.

Through the years I've had the pleasure of doing Youth Forums with many talented young people. Little 8-year-old Louis Zuckerman, KD4HRD; Extra Class holder at 11 years of age Dan Savio, AA2GM; and lovely young ladies Angie Fischer, KB0HXY; Mary Alestra, KB2IGG; and Christine Witkowski, KC6YUT are only a few of the many impressive and eloquent young adults I have worked with.

Remember to use this valuable resource that we have in amateur radio—young people. Use them at your field day activities, parades, marathons and club events. Make sure they are made to feel welcome and needed.

At this time I am looking for enthusiastic and eloquent ham radio operators under the age of 18 to participate in the '93 Dayton Hamvention Youth Forum and in the June Texas Hamcom. If you know a youngster who is interested in being interviewed, please have them call me at (718) 983-1416 or write to me at P.O. Box 131646, Staten Island, NY 10313-0006 and include a phone number. ■

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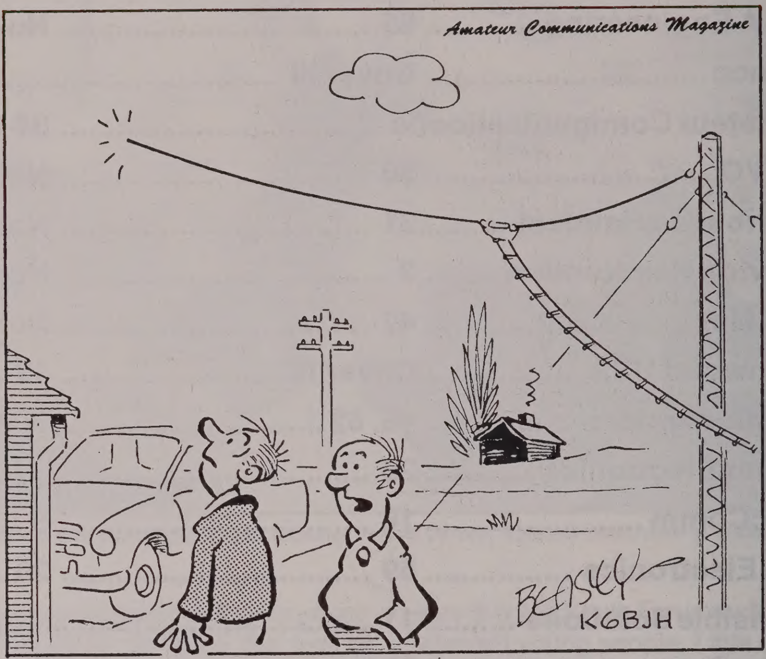

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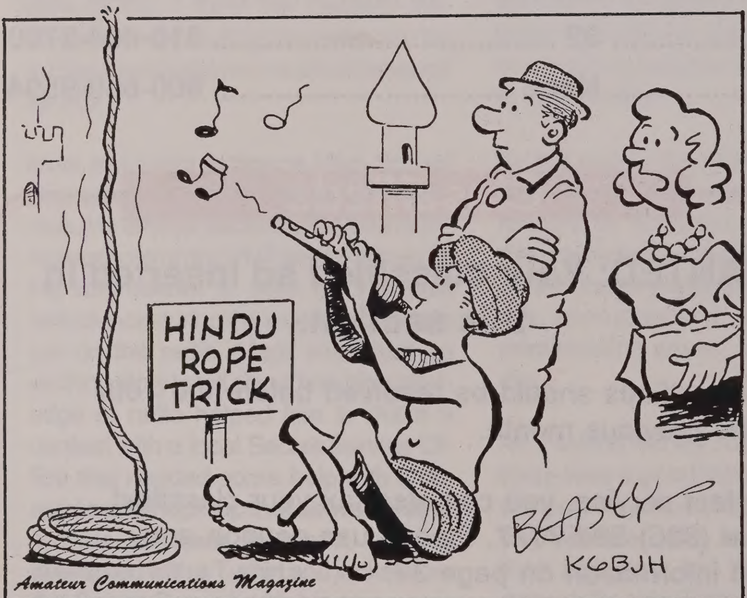

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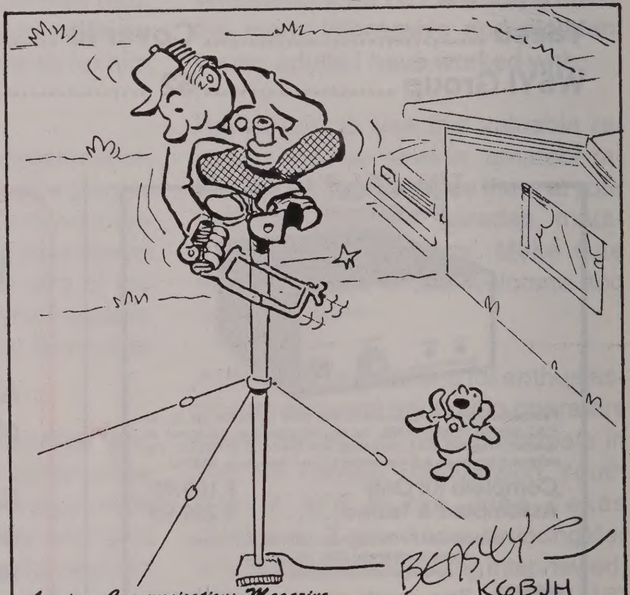

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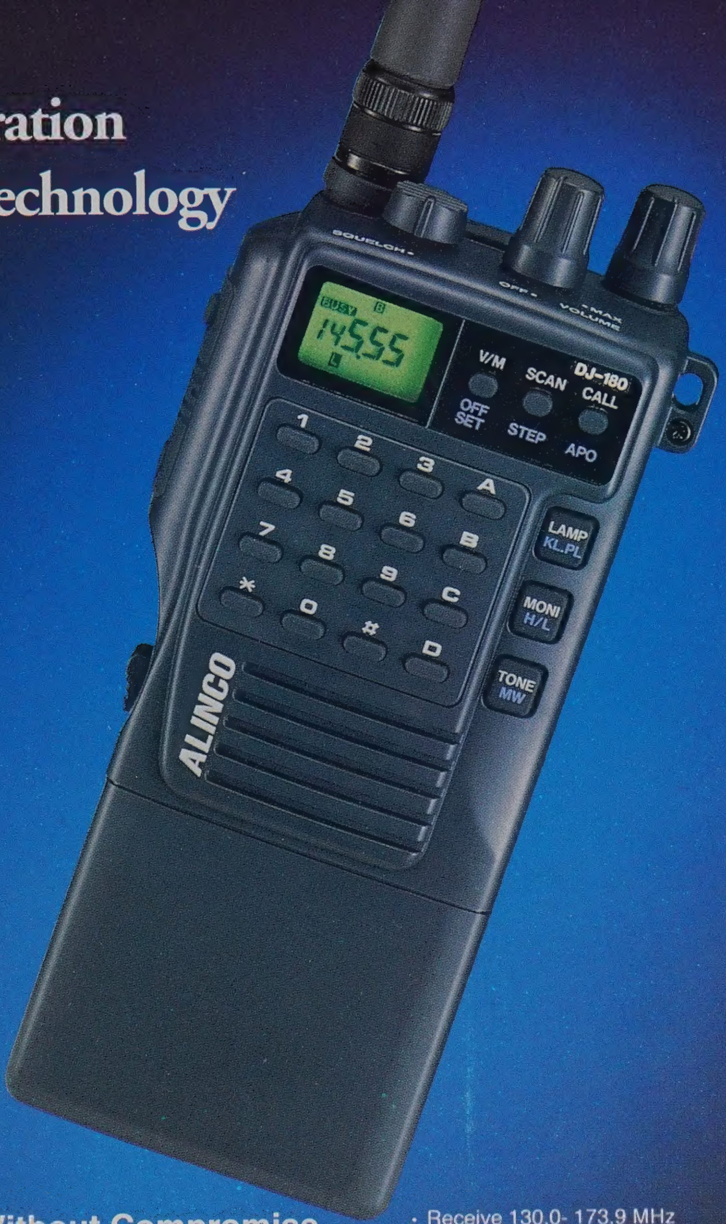

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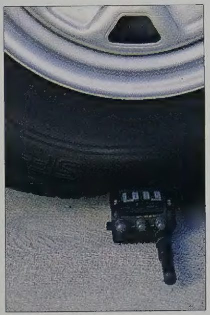

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Introducing the TM-742A and TM-942A—high-performance mobile transceivers with innovative 3-way convenience

Deciding on where to mount a transceiver can be a tough call. But with Kenwood's new TM-742A (144MHz/440MHz) and TM-942A (144MHz/440MHz/1200MHz) FM multi-banders, you get to enjoy real freedom of choice, because controls and display can be installed separately (requires optional kit). With their top-flight features and turbo-charged performance, these transceivers bring stylish sophistication to the world of mobile communications.

●High output—50 watts (144MHz), 35 watts (440MHz), 10 watts (1200MHz) ●100 memory channels+1 call channel and memory bank system ●8 scan modes per band, plus CO and TO scan stop modes ●Independent SQL and VOL controls for each band ●Automatic band change (A.B.C.) ●S meter squelch, noise squelch & auto squelch ●Tone alert with elapsed time indicator ●Date & time display, stopwatch, alarm, on/off timer ●Direct frequency entry with supplied microphone ●Cross-band repeater, dual-in repeater, fixed-band repeater

TM-742A/942A

Mobile Transceivers

●New & improved detachable front panel

Total 3-way convenience. For example, the main unit can be installed in the trunk, while the display and controls are mounted either side of the steering wheel (with DFK-3, 4, 7).

●Tri-band receive/display

The TM-942A can receive three bands simultaneously, with all three frequencies displayed on the LCD panel. The TM-742A can be upgraded to tri-band status with one of four optional band units (28MHz, 50MHz, 220MHz, and 1200MHz).

●Built-in DTSS with pager function

DTSS allows DTMF access to the transceiver: the squelch is opened only when a specific 3-digit code is received. Also, a pager alerts the operator to an incoming call.

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CIRCLE 14 ON READER SERVICE CARD